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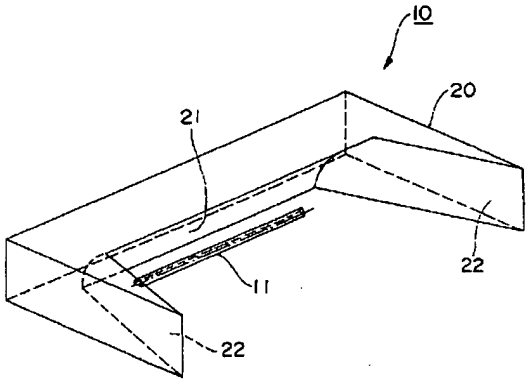
(54)【発明の名称】　灯　具

(57)【要約】
【課題】　本発明は、簡単な構成により、線状光源を利用して、反射部材により線状光源からの光の利用効率を向上させるようにした、灯具を提供することを目的とする。
【解決手段】　横方向に延びるように配設された線状光源１１と、上記線状光源からの光を前方に向かって反射させるように、線状光源の後方に配設された反射部材２０と、から構成されており、上記反射部材が、上記線状光源の長手方向に沿って後方に配設された凹状の第一の反射面２１を備え、上記第一の反射面が、線状光源の長手方向に垂直な断面にて、楕円反射面であって、上記線状光源が上記第一焦点付近に位置するように配設されるように、灯具１０を構成する。



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【特許請求の範囲】

【請求項１】　横方向に延びるように配設された線状光源と、

上記線状光源からの光を前方に向かって反射させるように、線状光源の後方に配設された反射部材と、から構成されており、

上記反射部材が、上記線状光源の長手方向に沿って後方に配設された凹状の第一の反射面を備え、

上記第一の反射面が、線状光源の長手方向に垂直な断面にて、楕円反射面であって、

上記線状光源が、上記第一焦点付近に位置するように配設されていることを特徴とする、灯具。

【請求項２】　上記反射部材が、第一の反射面の側方前方の領域に配設された第二の反射面を備え、

上記第二の反射面が、放物反射面であることを特徴とする、請求項１に記載の灯具。

【請求項３】　上記第一の反射面が、上記線状光源からの角度が０度から１２０度の範囲内に配設されていることを特徴とする、請求項１または２に記載の灯具。

【請求項４】　上記第一の反射面の長手方向の長さが、線状光源の長さの０．７乃至１．５倍であることを特徴とする、請求項１から３の何れかに記載の灯具。

【請求項５】　上記線状光源が、長手方向に垂直な断面にて同一外形のレンズを備えており、

上記線状光源の長手方向に延びる一側縁が、上記レンズの中心に配置されていることを特徴とする、請求項１から４の何れかに記載の灯具。

【請求項６】　上記反射部材が、光軸より上側にのみ配置されており、

上記線状光源が、光軸上にて上向きに、且つ上記一側縁が反射部材の第一の反射面の第一焦点位置付近に、そして線状光源全体がこの第一焦点位置付近から前方領域に配置されていることを特徴とする、請求項５に記載の灯具。

【請求項７】　上記反射部材が、光軸より下側にのみ配置されており、

上記線状光源が、光軸上にて下向きに、且つ上記一側縁が反射部材の第一の反射面の第一焦点位置付近に、そして線状光源全体がこの第一焦点位置付近から後方領域に配置されていることを特徴とする、請求項５に記載の灯具。

【請求項８】　上記線状光源が、後方に向かって傾斜するように配置されていることを特徴とする、請求項６または７に記載の灯具。

【請求項９】　上記反射部材が、上記線状光源の長手方向に沿って後方に配設された第三の反射面を備え、

上記第三の反射面が、前方左側もしくは前方右側にて水平線よりやや上側に光を反射させるように構成されていることを特徴とする、請求項１から８の何れかに記載の灯具。

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【請求項１０】　横方向に延びるように配設された線状光源と、

上記線状光源からの光を前方に向かって反射させるように、線状光源の後方に配設された反射部材と、から構成されており、

上記反射部材が、上記線状光源の長手方向に沿って後方に配設された凹状の反射面から構成されていて、

上記反射面が、照射方向の目標点及び光源上の点を通る軸を中心とした円錐曲線の回転体により形成される反射面であって、

上記線状光源の投影像が上記目標点を中心に回転した斜め方向の領域を照射するように配設されていることを特徴とする、灯具。

【請求項１１】　上記円錐曲線の回転体により形成される反射面が、回転楕円反射面であり、その第一焦点が上記線状光源上に位置し、且つ第二焦点がｚ軸方向前方の斜め照射領域を形成する目標点に位置するように配設されており、

さらに、上記反射面が、線状光源を回転軸周りに所定角度だけ回転させて、前方一側にて水平線よりもやや斜め上方向に光を反射させるように構成されていることを特徴とする、請求項１０に記載の灯具。

【請求項１２】　上記線状光源が、ＬＥＤアレイであることを特徴とする、請求項１から１１の何れかに記載の灯具。

【請求項１３】　上記線状光源が、線状に形成された面発光素子であることを特徴とする、請求項１から１１の何れかに記載の灯具。

【請求項１４】　請求項１から１１の何れかの灯具を複数個備えており、各灯具からの照明光を互いに重畳させることを特徴とする、照明装置。

【発明の詳細な説明】

【０００１】

【発明の属する技術分野】本発明は、例えば自動車の前部に設けられた前照灯または補助前照灯として使用される車両用灯具あるいは各種照明灯に使用される線状光源を使用した灯具に関するものである。

【０００２】

【従来の技術】従来、例えば自動車の前照灯は、光源と、光源からの光を前方に向かって反射させる例えば回転放物面から成る主反射面と、拡散レンズカットと、から構成されており、光源からの光を主反射面によりほぼ平行光に変換して、前方に向かって照明光を照射するようになっている。そして、上記光源は、例えばハロゲンバルブ，放電灯バルブ等のバルブが使用されている。ここで、このようなバルブは、発光部がミクロ的には線状あるいは矩形状に形成されているが、マクロ的には点光源として扱われる。

【０００３】

【発明が解決しようとする課題】ところで、線状光源を

使用した車両用灯具は、例えばＬＥＤアレイを所謂ハイマウントストップランプとして使用するものが知られている。しかしながら、このようなハイマウントストップランプは、ＬＥＤアレイをそのまま自動車の後部に配置しただけの構成であり、反射部材により反射光を利用するようには構成されていない。このため、線状光源であるＬＥＤアレイからの光の利用効率が低くなって、照射光が暗くなってしまう。さらに、自動車の前照灯だけでなく、自動車の補助前照灯やテールランプ，ドライビングランプ，バックアップランプ等の信号灯や、各種照明灯等においても、線状光源を利用した灯具は実際に使用されていない。

【０００４】本発明は、以上の点から、簡単な構成により、線状光源を利用して、反射部材により線状光源からの光の利用効率を向上させるようにした、灯具を提供することを目的としている。

【０００５】

【課題を解決するための手段】上記目的は、本発明の第一の構成によれば、横方向に延びるように配設された線状光源と、上記線状光源からの光を前方に向かって反射させるように、線状光源の後方に配設された反射部材と、から構成されており、上記反射部材が、上記線状光源の長手方向に沿って後方に配設された凹状の第一の反射面を備え、上記第一の反射面が、線状光源の長手方向に垂直な断面にて、楕円反射面であって、上記線状光源が、上記第一焦点付近に位置するように配設されていることを特徴とする、灯具により、達成される。

【０００６】本発明による灯具は、好ましくは、上記反射部材が、第一の反射面の側方前方の領域に配設された第二の反射面を備え、上記第二の反射面が、放物反射面である。

【０００７】本発明による灯具は、好ましくは、上記第一の反射面が、上記線状光源からの角度が０度から１２０度の範囲内に配設されている。

【０００８】本発明による灯具は、好ましくは、上記第一の反射面の長手方向の長さが、線状光源の長さの０．７乃至１．５倍である。

【０００９】本発明による灯具は、好ましくは、上記線状光源が、長手方向に垂直な断面にて同一外形のレンズを備えており、上記線状光源の長手方向に延びる一側縁が、上記レンズの中心に配置されている。

【００１０】本発明による灯具は、好ましくは、上記反射部材が、光軸より上側にのみ配置されており、上記線状光源が、光軸上にて上向きに、且つ上記一側縁が反射部材の第一の反射面の第一焦点位置付近に、そして線状光源全体がこの第一焦点位置付近から前方領域に配置されている。

【００１１】本発明による灯具は、好ましくは、上記反射部材が、光軸より下側にのみ配置されており、上記線状光源が、光軸上にて下向きに、且つ上記一側縁が反射部材の第一の反射面の第一焦点位置付近に、そして線状光源全体がこの第一焦点位置付近から後方領域に配置されている。

【００１２】本発明による灯具は、好ましくは、上記線状光源が、後方に向かって傾斜するように配置されている。

【００１３】本発明による灯具は、好ましくは、上記反射部材が、上記線状光源の長手方向に沿って後方に配設された第三の反射面を備え、上記第三の反射面が、前方左側もしくは前方右側にて水平線よりやや上側に光を反射させるように構成されている。

【００１４】また、上記目的は、本発明の第二の構成によれば、横方向に延びるように配設された線状光源と、上記線状光源からの光を前方に向かって反射させるように、線状光源の後方に配設された反射部材と、から構成されており、上記反射部材が、上記線状光源の長手方向に沿って後方に配設された凹状の反射面から構成されていて、上記反射面が、照射方向の目標点及び光源上の点を通る軸を中心とした円錐曲線の回転体により形成される反射面であって、上記線状光源の投影像が上記目標点を中心に回転した斜め方向の領域を照射するように配設されていることを特徴とする、灯具により、達成される。

【００１５】本発明による灯具は、好ましくは、上記円錐曲線の回転体により形成される反射面が、回転楕円反射面であり、その第一焦点が上記線状光源上に位置し、且つ第二焦点がｚ軸方向前方の斜め照射領域を形成する目標点に位置するように配設されており、さらに、上記反射面が、線状光源を回転軸周りに所定角度だけ回転させて、前方一側にて水平線よりもやや斜め上方向に光を反射させるように構成されている。

【００１６】本発明による灯具は、好ましくは、上記線状光源が、ＬＥＤアレイである。

【００１７】本発明による灯具は、好ましくは、上記線状光源が、線状に形成された面発光素子である。

【００１８】さらに、上記目的は、本発明によれば、さらに上記灯具を複数個備え、各灯具からの照明光を互いに重畳させるようにした照明器具により、達成される。

【００１９】上記第一の構成によれば、線状光源、好ましくはＬＥＤアレイまたは線状に形成された面発光素子から成る線状光源から出射した光は、直接にまたは反射部材の第一の反射面により反射されて、前方に向かって進むことになる。これにより、線状光源から出射した光の一部が、反射部材の第一の反射面により反射されて、前方に向かって照射され、前方領域を照明することになる。従って、線状光源から出射した光の利用効率が向上し、明るい照明光が得られることになる。

【００２０】上記反射部材が、第一の反射面の側方前方の領域に配設された第二の反射面を備え、上記第二の反射面が、放物反射面である場合には、線状光源、好まし

くはＬＥＤアレイまたは線状に形成された面発光素子から成る線状光源から出射した光のうち、線状光源の両端面の領域にて、両側に向かって進む光が、第二の反射面により反射されて、前方に向かって進むことになる。これにより、線状光源から出射した光の一部が、反射部材の第二の反射面により反射されて、前方に向かって照射され、前方領域を照明することになる。従って、線状光源から出射した光の利用効率が向上し、明るい照明光が得られることになる。

【００２１】上記第一の反射面が、上記線状光源からの角度が０度から１２０度の範囲内に配設されている場合には、線状光源から出射した光のほぼ８０％以上の光が第一の反射面で反射されるので、線状光源から出射した光の利用効率がより一層向上することになり、より明るい照明光が得られることになる。

【００２２】上記第一の反射面の長手方向の長さが、線状光源の長さの０．７乃至１．５倍である場合には、線状光源から出射した光が、第一の反射面により効率良く反射され、前方に向かって進むので、より明るい照明光が得られることになる。

【００２３】上記線状光源が、長手方向に垂直な断面にて同一外形のレンズを備えており、上記線状光源の長手方向に延びる一側縁が、上記レンズの中心に配置されている場合には、この一側縁からの光が、長手方向に垂直な断面にて、レンズの中心から出射することになるので、レンズの長手方向に垂直な方向の屈折効果を受けずに、直進することになる。従って、反射部材の第一の反射面により反射され前方に向かって照射される光の配光パターンの照射領域と非照射領域との境界のコントラストが良好となる。また、レンズが長手方向に関して同一外形を備えていることにより、長手方向に関してほぼ均一な配光特性が得られることになる。

【００２４】上記反射部材が、光軸より上側にのみ配置されており、上記線状光源が、光軸上にて上向きに、且つ上記一側縁が反射部材の第一の反射面の第一の焦点位置付近に、そして線状光源全体がこの第一焦点位置付近から前方領域に配置されている場合には、線状光源から出射する光が、第一の反射面により反射され前方に向かって進む際に、水平線より下方に照射されることになる。

【００２５】上記反射部材が、光軸より下側にのみ配置されており、上記線状光源が、光軸上にて下向きに、且つ上記一側縁が反射部材の第一の反射面の第一焦点位置付近に、そして線状光源全体がこの第一焦点位置付近から後方領域に配置されている場合には、線状光源から出射する光が、第一の反射面により反射され前方に向かって進む際に、水平線より下方に照射されることになる。

【００２６】上記線状光源が、後方に向かって傾斜するように配置されている場合には、線状光源から反射部材の第一の反射面に入射する光の入射効率が向上することになり、前方に向かって反射される光による照度が上昇すると共に、同じ照度を得るためには、反射部材の第一の反射面が小型に構成され得ることになる。

【００２７】上記反射部材が、上記線状光源の長手方向に沿って後方に配設された第三の反射面を備え、上記第三の反射面が、前方左側もしくは前方右側にて水平線よりやや上側に光を反射させるように構成されている場合には、この第三の反射面によって、線状光源からの光が、前方に向かって左側にてやや上側に照射されることにより、路肩や歩行者等を照明することができる。

【００２８】上記第二の構成によれば、線状光源、好ましくはＬＥＤアレイまたは線状に形成された面発光素子から成る線状光源から出射した光は、直接にまたは反射部材の反射面により反射されて、前方に向かって進む。これにより、線状光源から出射した光が、反射部材の反射面により反射されることにより、光軸の周りに回転した線状光源の像を形成することになるため、前方に向かって一側（左側通行の場合には左側、右側通行の場合には右側）にてやや上側に照射されることにより、すれ違いビームとして、路肩や歩行者等を照明することができる。

【００２９】上記円錐曲線の回転体により形成される反射面が、回転楕円反射面であり、その第一焦点が上記線状光源上に位置し、且つ第二焦点がｚ軸方向前方の斜め照射領域を形成する目標点に位置するように配設されており、さらに、上記反射面が、線状光源を回転軸周りに所定角度だけ回転させて、前方一側にて水平線よりもやや斜め上方向に光を反射させるように構成されている場合には、線状光源から出射した光が、反射面により反射されることにより、第二の焦点に向かって収束し、且つ光軸の周りに回転した線状光源の像を形成することになる。

【００３０】さらに、上記灯具を複数個備え、各灯具からの照明光を互いに重畳させるようにした照明器具によれば、複数の灯具からの照明光を集中させることにより、より一層明るい照明光が得られることになる。

【００３１】

【発明の実施の形態】以下、この発明の好適な実施形態を図１乃至図１９を参照しながら、詳細に説明する。尚、以下に述べる実施形態は、本発明の好適な具体例であるから、技術的に好ましい種々の限定が付されているが、本発明の範囲は、以下の説明において特に本発明を限定する旨の記載がない限り、これらの態様に限られるものではない。

【００３２】図１は、本発明を車両用灯具に適用した一実施形態の構成を示している。図１において、車両用灯具１０は、所謂すれ違いビーム用の自動車の前照灯の水平線より下向きの配光、即ち水平拡散配光を実現する灯具であって、線状光源としてのＬＥＤアレイ１１と、ＬＥＤアレイ１１の後側に配設された反射部材２０と、か

ら構成されている。

【００３３】上記ＬＥＤアレイ１１は、図２に示すようなＬＥＤアレイモジュール１２を長手方向に沿って複数個並べることにより、構成されている。ここで、ＬＥＤアレイモジュール１２は、図２に示すように、基板１３の凹部１３ａ内にて長手方向に並んで実装された複数個、例えば５乃至１０個（図示の場合、５個）のＬＥＤチップ１４と、ＬＥＤチップ１４を覆うように配置された蛍光体層１５と、基板１３の表面のほぼ全体を覆うように形成されたシリコンゲル１６と、基板１３の表面全体を覆うように形成されたレンズ１７と、から構成されている。

【００３４】上記ＬＥＤチップ１４は、例えば一辺の長さＤ（＝１．０ｍｍ）のチップサイズの青色ＬＥＤとして構成されており、凹部１３ａの壁面１３ｂにその一辺を当接させることにより、各ＬＥＤチップ１４が基板１３の長手方向の中心から距離Ｄ／２だけ側方にずれて配置されることによって、その長手方向の一側縁１４ａが、基板１３の長手方向の中心に沿って整列して配置されている。

【００３５】上記蛍光体層１５は、例えばＹＡＧ蛍光体から構成されており、ＬＥＤチップ１４からの照射光により励起されて白色光を出射するようになっている。上記シリコンゲル１６は、ＬＥＤチップ１４及び蛍光体１５を保護すると共に、レンズ１７との間での隙間の発生を防止して、光の取出し効率が低下しないようにするものである。

【００３６】上記レンズ１７は、長手方向に延びる半円筒状の外形を有しており、その中心軸が、上記各ＬＥＤチップ１４の一側縁１４ａとほぼ一致するように形成されている。ここで、レンズ１７の半円筒状の半径をＲ，ＬＥＤチップ１４の一辺の長さをＤ，臨界角をαとすると、以下の式

$R \geq \sqrt{2} \cdot D / \sin\alpha$

に従って、半径Ｒを決定することにより、レンズ１７の内面反射を低減させて、例えばＤ＝１．０ｍｍ，α＝４２．５度，Ｒ＝２．１ｍｍとすると、ＬＥＤチップ１４から出射する光に関して、計算上、約８０％の取出し効率で有効光を取り出すことができる。

【００３７】上記反射部材２０は、ＬＥＤアレイ１１からの光を反射して、前方に向かって反射させるように、前方に向かって凹状の第一の反射面２１と、第一の反射面２１の両側に設けられた第二の反射面２２と、を有している。

【００３８】ＬＥＤアレイ１１の長手方向をｘ方向，灯具前方の水平軸をｚ方向，長手方向に対して垂直な上下方向をｙ方向とする直交座標系としたとき、上記第一の反射面２１は、ｙｚ平面の断面（ＬＥＤアレイ１１の長手方向に対して垂直な断面）にて、楕円反射面として形成されている。

【００３９】ここで、楕円反射面は、図３（Ｂ）の概略図に示したように、ｚ方向において第一焦点（Ｆ１）及び第二焦点（Ｆ２）を有する楕円を構成する楕円曲線にて表現可能な断面曲線、即ち一平面上で二定点Ｆ１，Ｆ２からの距離の和（Ｆ１Ｐ＋Ｆ２Ｐ）が一定であるような点Ｐの軌跡の曲線から成る反射面をいう。しかしながら、本明細書においては、楕円反射面として、前述した狭義の楕円反射面だけでなく、厳密には第一焦点及び第二焦点を有する楕円曲線に一致しないが、この楕円断面に近似可能な断面曲線から成る反射面も含む。従って、第一焦点及び第二焦点も、狭義の楕円曲線により実現可能な断面曲線における第一焦点及び第二焦点だけでなく、各々の反射面に近似する楕円曲線の第一焦点及び第二焦点を含む。

【００４０】また、上記第一の反射面２１は、ＬＥＤアレイ１１の発光面と平行な角度を０度としたとき、角度ψが０度から１２０度の範囲内に入るように形成されている。尚、図１において、第一の反射面２１は、何れのｙｚ平面断面においても同じ形状を有するように、所謂かまぼこ型に形成されているが、これに限らず、ｘ方向に関して曲率を有するように形成されていてもよい。

【００４１】そして、第一の反射面２１は、図３（Ａ）に示すように、その第一の焦点位置２１ａが上向きに配置されたＬＥＤアレイ１１のレンズ１７の中心付近に位置するように、また第二の焦点位置２１ｂが第一の焦点位置２１ａの例えば２５ｍ前方のスクリーン上の光軸Ｏ（ｚ軸）より約０．５度下方に位置するように、配設されており、前照灯としての法規を満足するようにしている。ここで、上記ＬＥＤアレイ１１は、図３に示すように、そのＬＥＤチップ１４の一側縁１４ａが、第一の反射面２１の第一の焦点位置２１ａと一致し、且つ全体が第一の焦点位置２１ａより前方に位置するように、配置されている。

【００４２】これにより、ＬＥＤアレイ１１の各ＬＥＤチップ１４の一側縁１４ａが、レンズ１７の中心に沿って且つ第一の反射面２１の第一の焦点位置２１ａ付近に位置しており、各ＬＥＤチップ１４全体がこの第一の焦点位置２１ａから前方に配置されていることから、各ＬＥＤチップ１４の一側縁１４ａから出射した光Ｌ１は、レンズ１７のｙｚ平面断面における屈折作用を受けずに、第一の反射面２１により反射され、第二の焦点位置２１ｂに向かって進むことになる。

【００４３】また、各ＬＥＤチップ１４の全体は、一側縁１４ａよりも前方に位置するように配置されているので、ＬＥＤチップ１４からの光は、レンズ１７により屈折された後、第一の反射面２１により反射され、光Ｌ１よりも下方に向かって進むことになる。例えば最も前方側となる他の側縁から出射した光Ｌ２は、第二の焦点位置２１ｂよりも常に下向きに反射される。従って、ＬＥＤチップ１４そして蛍光体層１５から出射して第一の反

射面２１で反射された光は、前方に向かって水平線より下側の、第二の焦点位置２１ｂよりも下方に向かって照射される。このとき、ＬＥＤチップ１４の一側縁１４ａから出射した光Ｌ１はレンズ１７の長手方向（ｘ方向）に対して垂直な断面（ｙｚ平面）における屈折作用を受けないので、第一の反射面２１で反射され前方に向かって水平線以下に照射される光の水平線における照射領域と非照射領域との境界を照射し、これによりコントラストが良好となる。

【００４４】これに対して、反射部材２０の第二の反射面２２は、図４に示すように、ｘｚ平面（長手方向及び光軸方向に垂直な断面）にて、放物反射面として形成されている。ここで、本明細書において、放物反射面とは、特に断わりのない限り反射面の垂直断面において放物曲線にて表現可能な断面曲線となる放物反射面だけでなく、この放物面に近似可能な反射面、例えば放物曲線に近似するが厳密には放物曲線の軸を有していないベジエ曲線から成る擬似放物曲線反射面を含めて放物反射面と定義する。上記放物反射面は、第一の反射面２１の両側にて（図４では一側のみが示されている）、ＬＥＤアレイ１１の反対側の端縁１１ａから出射して第一の反射面２１により反射された最大拡散角θ（例えば４５度）の光を反射させ、前方スクリーン上にて所定の配光パターンを得るための目標点に向かって照射し得るように、例えば中心軸Ｏ（ｚ軸）の真下の目標点Ａ、例えば２５ｍ前方のスクリーンにて約０．５度下の点（図５参照）を焦点位置とし、目標点Ａから中心軸Ｏに対して角度θだけ傾斜した軸Ｂを軸とし、さらに第一の反射面２１の一側の端部２１ａを始点とする放物線Ｃから構成されており、当該放物線Ｃをｙ方向にスイープした、すなわちｘｚ平面断面において放物線Ｃが現われる反射面としている。

【００４５】そして、上記放物反射面の終点２２ａは、ＬＥＤアレイ１１の反対側の端縁から出射して第一の反射面２１により反射された最大拡散角θの光が入射する位置として、軸Ｂを中心に放物線Ｃを回転させた回転放物面反射面とする。これにより、ＬＥＤアレイ１１から最大拡散角θ以上の角度で拡散する光は、第二の反射面２２により反射され、目標点Ａに向かって、ほぼ水平の下向きに反射されるようになっており、中心付近の照度を向上させる。

【００４６】本発明実施形態による車両用灯具１０は、以上のように構成されており、ＬＥＤアレイ１１の各ＬＥＤチップ１４が図示しない駆動回路により給電されて発光することにより、ＬＥＤアレイ１１から出射した光は、反射部材２０の第一の反射面２１及び第二の反射面２２で反射されることにより、前方に向かって照射される。

【００４７】ここで、ＬＥＤアレイ１１から出射した光は、図５に示すように、反射部材の第一の反射面２１により反射される際に、第一の反射面２１の形状に基づいて垂直方向に関して制御されることにより、水平線Ｈより僅かに下方の照射領域Ｄ’向かって照射される。また、第一の反射面２１により反射される光のうちの一部、照射領域Ｄ’の両端に向かって照射される光は、第二の反射面２２により反射され、第二の反射面２２の形状に基づいて水平方向に関して制御されて、第一の反射面２１による照射領域Ｄ’の両端領域に相当する光が、中心軸Ｏの下方の領域を照射して中心部の照度をより明るくして、全体として最大拡散角θに制限された照射領域Ｄを形成する。これにより、図６に示すような所謂すれ違いビームにおける水平拡散配光に適した配光パターンが得られることになる。

【００４８】尚、上述した車両用灯具１０においては、ＬＥＤアレイ１１は、光軸Ｏ上にてＬＥＤチップ１４が基板１３の上面に、即ち上向きに配置され、反射部材２０が光軸Ｏの上側に配置されているが、これに限らず、図７に示すように、ＬＥＤアレイ１１が光軸Ｏ上にて下向きに配置され、反射部材２０が光軸Ｏの下側に配置されるようにしてもよい。この場合、ＬＥＤアレイ１１は、そのＬＥＤチップ１４の一側縁１４ａが、第一の反射面２１の第一の焦点位置２１ａと一致し、且つ全体が第一の焦点位置２１ａより後方に位置するように、配置されている。これにより、図３に示した配置の場合と同様に、ＬＥＤアレイ１１から出射した光が、反射部材２０の第一の反射面２１により反射されることにより、光軸Ｏより僅かに下方に向かって照射されることになる。

【００４９】尚、一般的にＬＥＤチップから出射する光は、指向特性を有する。上述したように、ＬＥＤアレイ１１の各ＬＥＤチップ１４の一側縁１４ａがレンズ１７の中心軸とほぼ一致するように、且つ他の側縁がレンズ１７の中心から外れた位置に整列するように配置された線光源を用いると、ＬＥＤアレイ１１の指向特性は、図８に示すように、ＬＥＤチップ１４をシフトさせた側とは反対方向（図８にて左方）に傾斜した指向特性を示すものとなる。尚、図８において、法線方向を０度とし、左方をマイナス方向，右方をプラス方向としている。そして、後述する第一の反射面２１は、この傾斜した指向特性の中心軸の光を反射するように、照射方向即ち図面左方に配置する。ここで、光の利用効率を高く、且つ灯具全体を小型化するためには、ＬＥＤアレイの指向特性の中心軸が２０乃至５０度の範囲に位置するような大きさのＬＥＤ光源となるように、ＬＥＤチップの大きさ及び前述した数式１に従って求めたレンズ１７の大きさを決定することが望ましい。

【００５０】さらに、第一の反射面２１は、図９に示すように、少なくとも０乃至１００度の範囲とすると、上述した図８に示す指向特性を備えたＬＥＤアレイ１１から照射される光に対する利用効率を高めることができる。実用的には、上記線状光源からの光のうち、６０％

以上の光を有効に反射させることができるように配置することが望ましく、第一の反射面２１を０乃至１２０度の範囲とすると、第一の反射面２１の断面方向にてほぼ８０％以上の光を有効に反射させることが可能となる。

【００５１】さらに、上述した車両用灯具１０においては、ＬＥＤアレイ１１は、図３または図７に示すように、その基板１３の表面が光軸Ｏに沿って延びるように配置されているが、これに限らず、図１０または図１１に示すように、光軸Ｏに対して後方に向かって傾斜角φ、例えば図１０または図１２に示すように１０度だけ、傾斜して配置されていてもよい。これらの場合には、第一の反射面２１で反射するＬＥＤアレイ１１から出射した光Ｌを増大させることが可能となり、より効率良く反射部材２０の第一の反射面２１及び第二の反射面２２で反射され、前方に向かって照射されることになり、配光パターンの照度が向上することになる。従って、同じ照度を得るためには、反射部材２０が小型に構成され得ることになる。

【００５２】図１３は、本発明による車両用灯具の第二の実施形態の構成を示している。図１３において、車両用灯具３０は、所謂すれ違いビーム用の自動車の前照灯であって、図１乃至図４に示した車両用灯具１０とほぼ同様の構成であるから、同じ構成部品には同じ符号を付して、その説明を省略する。

【００５３】上記車両用灯具３０は、反射部材２０が第一の反射面２１及び第二の反射面２２に加えて、さらに第三の反射面３１を備えている点でのみ異なる構成になっている。上記第三の反射面３１は、図１３に示すように、第一の反射面２１及び第二の反射面２２の間の領域に配置されている。

【００５４】上記第三の反射面３１は、複数の反射面から成る複合反射面として構成され、各々の反射面３１ａが回転楕円面から構成されている。各反射面３１ａは、ＬＥＤアレイ１１からの光を反射させることにより、目標点Ａから左側にて左上がり１５度の線Ｅ（図１４（Ａ）参照）より下方を照射するように、形成されており、このカットオフラインＥに沿って線状光源１１の各ＬＥＤチップ１４の一側縁１４ａから出射した光が、レンズ１７の屈折作用を受けずに進行してカットオフラインＥに沿って、配光パターンの照射領域と非照射領域との境界のコントラストを明瞭にすることができる。

【００５５】ここで、上記第三の反射面３１について、図１５及び図１６を参照しながら説明する。図１５に示すように、線状光源１１上の点を第一焦点Ｆ１とし、２５ｍ前方のスクリーン上にて、ｚ軸より約０．５度だけ－ｙ方向の目標点Ａを第二焦点Ｆ２とする楕円曲線を求める。Ｆ１及びＦ２を結ぶ直線を回転軸として楕円曲線を回転させて回転楕円面を作成する。このようにして得られた回転楕円面から成る反射面においては、第一焦点Ｆ１がスクリーン上に投影された点Ｆ２を中心として線状光源１１による投影像が回転して得られる。この光源像が回転する性質を利用して左上がり１５度の線Ｅまでの範囲の領域を照射する回転楕円反射面の一部を反射面３１ａとする。このようにして得られた回転楕円反射面の形状を図１６に示す。図１６にて、手前の面が回転楕円反射面３１ａである。尚、図１５においては、説明を理解しやすくするために、線状光源１１の中心点の位置をＦ１とした場合の例を示しているが、各々の反射面３１ａにおいては、線状光源１１上の中心点ではなく、線状光源１１上の任意の位置であって、各反射面にて反射する光源に対応する位置をそれぞれＦ１として各反射面３１ａを形成している。これにより、図１４（Ａ）に示すように、目標点Ａから左側にて左上がり１５度の線Ｅよりも下方に照射する配光パターンを得ることができる。

【００５６】このような構成の車両用灯具３０によれば、前述した車両用灯具１０と同様にして、ＬＥＤアレイ１１から出射した光は、反射部材２０の第一の反射面２１及び第二の反射面２２により反射され、前方に向かって照射されることにより、図６に示すと同様の水平線Ｈより僅かに下方にて広がった水平拡散配光パターンを形成する。さらに、ＬＥＤアレイ１１からの光は、反射部材２０の第三の反射面３１により反射され、前方に向かってやや左側斜め上方に照射されることにより、図１４（Ａ）に示すように、目標点Ａから左側にて水平線Ｈよりやや上側にて左上がり１５度の線Ｅより下方を照射する。

【００５７】従って、図１４（Ｂ）に示すように、水平線Ｈより僅かに下方に形成した図６の配光パターンと、光軸Ｏから左側にて水平線Ｈよりやや上側に左上がり１５度より下方に形成した図１４（Ａ）の配光パターンとが重畳された配光パターンが、灯具前方のスクリーン上に形成される。これにより、車両用灯具３０を搭載した場合には、照射領域の中心部においては、反射面２１，反射面２２及び反射面３１の各々の反射面による照射光が重畳され、高い照度を得ることができる。このようにして、自動車の前方左側にて路肩の縁石や歩行者，そして道路標識等を明るく照明するので、左側通行の車両の安全性をより一層確保することができる。また、照射領域と非照射領域との境界である水平線方向のカットオフラインＦ及び左上斜めのカットオフラインＥが明確になるので、眩惑光等を低減することができる。

【００５８】尚、本実施形態では、前方左上がり１５度の線Ｅより下方を照明するようにしているが、右側通行の場合には、右上がり１５度とすればよい。また、楕円曲線から成る反射面により斜め照射領域を形成しているが、楕円曲線に限らず、他の円錐曲線を使用した回転反射面を採用してもよい。ただし、回転楕円反射面の場合には、集光性の配光パターンを容易に得ることができるが、他の円錐曲線の場合には、拡散性の配光パターンと

なりやすいので、円錐曲線としては楕円曲線を使用することが好ましい。

【００５９】図１７は、本発明による車両用灯具の第三の実施形態の構成を示している。図１７において、車両用灯具４０は、所謂すれ違いビーム用の自動車の前照灯であって、第二の実施形態にて説明した車両用灯具３０とほぼ同様の構成であるから、同じ構成部品には同じ符号を付して、その説明を省略する。

【００６０】上記車両用灯具４０は、線状光源４３が第一の反射面２１の前方に配置された第一線状光源部４１と、第三の反射面３１の前方に配置された第二線状光源部４２と、から構成されている点でのみ異なる構成になっており、線状光源４３は、上述したように、ＬＥＤチップが基板の長手方向の中心から距離Ｄ／２だけ側方にずれて配置されることにより、その長手方向の一側縁が、基板の長手方向の中心に沿って整列して配置されている。

【００６１】第二線状光源部４２は、図１７に示すように、複合反射面から成る第三の反射面３１の各反射面３１ａに対応して配設されており、各反射面３１ａの間の領域には形成されていない。各反射面３１ａと各第二線状光源部４２は、ＬＥＤチップの一側縁から出射した光がレンズ１７の長手方向に垂直な方向の屈折作用を受けずに各々の反射面３１により反射され、その反射光が、図１４（Ａ）に示した前方左上がり１５度のカットオフラインＥを照射するようにして、第二線状光源部４２から出射した光が、カットオフラインＥの下方を照射するようになっている。このとき、第三の反射面３１の各反射面３１ａに対応して配設される各々の第二線状光源部４２は、その長さを適宜に制御することにより、１５度斜め方向における照射幅を所定の領域のみに制限して、極端に上方または下方を照射する光が生じないようにしている。

【００６２】このような構成の車両用灯具４０によれば、前述した車両用灯具３０と同様にして、図１４（Ｂ）に示すような所謂すれ違いビーム用の自動車の前照灯に適した配光パターンを形成することができ、線状光源４１による配光パターンの形成効率を向上させると共に、第二線状光源部４２の第三の反射面３１の各反射面間に対応する領域に形成しないことにより、その分の光源の設置及び消費電力を低減させて、コストを削減することができる。尚、線状光源４３は、第一線状光源部４１及び各々の第二線状光源部４２をそれぞれ別体に形成することも可能であるが、上述したＬＥＤアレイ１１において、非発光領域に対応するＬＥＤチップ１６を配設しないようにして、互いに一体化して構成することが望ましい。

【００６３】図１８は、本発明による車両用灯具の第四の実施形態の構成を示している。図１８において、車両用灯具５０は、所謂すれ違いビーム用の自動車の前照灯であって、図１にて示した車両用灯具１０の上に、図１３に示した車両用灯具３０を重ねた構成であるから、同じ構成部品には同じ符号を付して、その説明を省略する。

【００６４】このような構成の車両用灯具５０によれば、前述した車両用灯具１０による水平線Ｈより僅かに下方の領域に広がる図６に示した配光パターンと、車両用灯具３０による左斜め上方向のカットオフラインＥ及び水平線方向カットオフラインＦを有する図１４（Ｂ）に示した配光パターンとが、カットオフラインＦより下方の位置にて重なるようにして、各灯具ユニットを並設することにより、より高い照度の配光パターンを得ることができる。

【００６５】尚、所望の配光パターン及び明るさを得るために、さらに別の灯具ユニットを使用したり、各灯具ユニットにおける複合反射面の照射領域を適宜の割合に組み合わせたり、各灯具鬼っとによる照射領域を適宜の範囲に制限して複数の灯具ユニットの組合せによって所定の配光を得るようにしてもよい。複数の灯具ユニットを使用する場合には、上下に並設するものに限らず、左右に並設したり、大きさの異なる灯具ユニットを組み合わせるようにしてもよい。

【００６６】上述した実施形態においては、ＬＥＤアレイ１１を構成するＬＥＤモジュール１２は、半円筒状のレンズ１７を備えているが、これに限らず、個々のＬＥＤチップ１４を覆う半球状のレンズを備えていてもよい。ただし、光源長手方向とほぼ平行な方向において広がる配光パターンを得ようとする場合には、長手方向に対して垂直な断面において同一な断面形状が現われるようなレンズ、例えば半円まりはこれに近似する曲線を長手方向に向かって平行移動させて現われるレンズ形状とすると、ＬＥＤチップから出射した光は、長手方向において同様の拡散を示すので、光源長手方向とほぼ平行な方向において均一な配光を得易くなり、好ましい。尚、上述した実施形態において、楕円反射面及び放物反射面として、各反射面に近似する擬似楕円反射面及び擬似放物反射面を使用した場合、上述した配光パターンは厳密には異なるものとなるが、近似する楕円反射面または放物反射面による配光パターンと近似した配光パターンが得られるので、実用上問題とはならない範囲内で、このような近似面を使用することができる。

【００６７】また、上述した実施形態の説明においては理解しやすいように、ｚ方向において第一焦点及び第二焦点を有する楕円を構成する楕円曲線にて表現可能な断面曲線から成る反射面、及び厳密には第一焦点及び第二焦点を有する楕円曲線に一致しないがこの楕円断面に近似可能な断面曲線から成る反射面を含めた楕円反射面を基に説明したが、広義には、断面形状が二次の有理Ｂｅｚｉｅｒ曲線（＝円錐曲線）を使用したものをいい、ＮＵＲＢＳ（鳥谷浩志著；３次元ＣＡＤの基礎と応用；共

立出版（株）発行）のような自由曲線により円錐曲線を近似した曲線を含む楕円反射面の定義により表現できる反射面を使用することもできる。例えば、灯具による照射領域と非照射領域との境界のコントラストを強調するのであれば、狭義の楕円反射面とすることが好ましいが、誇張して示した反射面が、図１９（Ａ）に示すような複数の円錐曲線を組み合わせたｙｚ断面形状や、図１９（Ｂ）に示すような変曲点を有する自由曲線を使用したｙｚ断面形状を備え、ｘ方向にかかる断面曲線をそのままスイープした反射面、即ちｙｚ平面における断面がすべて同一断面曲線となる反射面とすることもできる。これらの反射面を使用すれば、ｘ方向にスイープした反射面であることから、水平方向における光線の軌跡はすべて同じとなり、水平方向においてほぼ均一な配光パターンが得られ、上下方向に関しては、図示した反射面に基づいて反射光線軌跡の分布に粗密を設けた反射パターンが得られ、このような反射面を使用した実施形態も本願発明に包含される。

【００６８】さらに、上述した実施形態においては、複数のＬＥＤチップを並設したＬＥＤアレイとしての基台を使用したが、長手方向に延びて形成したＥＬ（エレクトロルミネセンス素子）等の面発光素子を光源として使用してもよい。また、自動車のすれ違いビーム用の前照灯としての車両用灯具１０に使用する灯具用線状光源１１，３０について説明したが、これに限らず、本発明は、自動車の走行ビーム用の前照灯、あるいは自動車用補助灯（フォグランプ，ドライビングランプ，バックアップランプ等）や自動車用信号灯（テールランプ，ターンランプ，ストップランプ等）、あるいは自動車用以外の例えば交通標識灯，交通信号灯，一般照明灯，作業灯，一般表示灯，一般信号灯等の各種灯具に使用するための灯具用線状光源に対して本発明を適用し得ることは明らかである。

【００６９】

【発明の効果】以上述べたように、本発明によれば、線状光源、好ましくはＬＥＤアレイまたは線状に形成された面発光素子から成る線状光源から出射した光は、直接にまたは反射部材の第一の反射面により反射されて、前方に向かって進むことになる。これにより、線状光源から出射した光の一部が、反射部材の第一の反射面により反射されて、前方に向かって照射され、前方領域を照明することになる。従って、線状光源から出射した光の利用効率が向上し、明るい照明光が得られることになる。

【００７０】このようにして、本発明によれば、簡単な構成により、線状光源を利用して、反射部材により線状光源からの光の利用効率を向上させるようにした、極めて優れた灯具が提供され得る。

【図面の簡単な説明】

【図１】本発明による車両用灯具の第一の実施形態を示す概略斜視図である。

【図２】図１の車両用灯具におけるＬＥＤアレイの構成を示す（Ａ）斜視図，（Ｂ）平面図及び（Ｃ）側面図である。

【図３】図１の車両用灯具を示す概略側面図である。

【図４】図１の車両用灯具を示す概略平面図である。

【図５】図１の車両用灯具の動作を示す概略斜視図である。

【図６】図１の車両用灯具による配光パターンを示す概略図である。

【図７】図１の車両用灯具の第一の変形例を示す概略側面図である。

【図８】図１の車両用灯具におけるＬＥＤアレイの指向特性を示すグラフである。

【図９】図１の車両用灯具におけるＬＥＤアレイと第一の反射面との関係を示す拡大断面図である。

【図１０】図１の車両用灯具の第二の変形例を示す概略側面図である。

【図１１】図１の車両用灯具の第三の変形例を示す概略側面図である。

【図１２】図１０の車両用灯具におけるＬＥＤアレイと第一の反射面との関係を示す拡大断面図である。

【図１３】本発明による車両用灯具の第二の実施形態を示す概略斜視図である。

【図１４】図１３の車両用灯具の反射部材の（Ａ）第三の反射面による配光パターン及び（Ｂ）反射部材全体による配光パターンを示す概略図である。

【図１５】図１３の車両用灯具における第三の反射面の構成及び配置を示す概略斜視図である。

【図１６】図１５の反射面を示す拡大斜視図である。

【図１７】本発明による車両用灯具の第三の実施形態を示す概略斜視図である。

【図１８】本発明による車両用灯具の第四の実施形態を示す概略斜視図である。

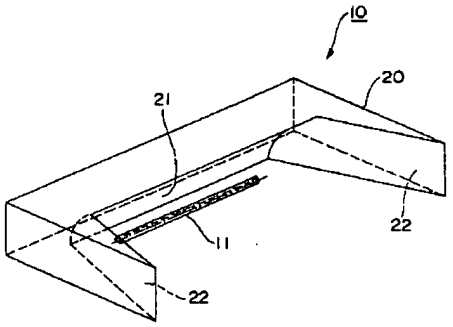
【符号の説明】

１０　車両用灯具
１１　ＬＥＤアレイ（線状光源）
１２　ＬＥＤモジュール
１３　基板
１４　ＬＥＤチップ
１５　蛍光体
１６　シリコンゲル
１７　レンズ
２０　反射部材
２１　第一の反射面
２２　第二の反射面
３０　車両用灯具
３１　第三の反射面
４０，５０　車両用灯具
４１　第一線状光源部
４２　第二線状光源部

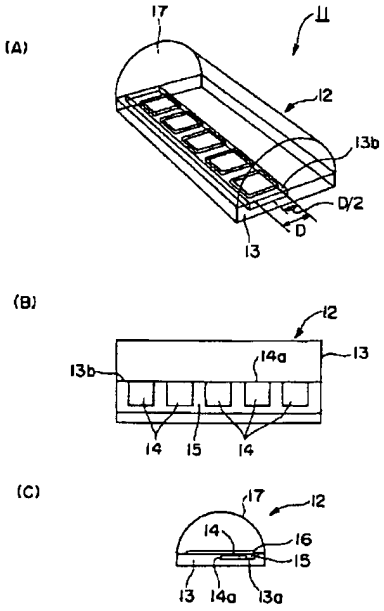
17 18

４３ 線状光源

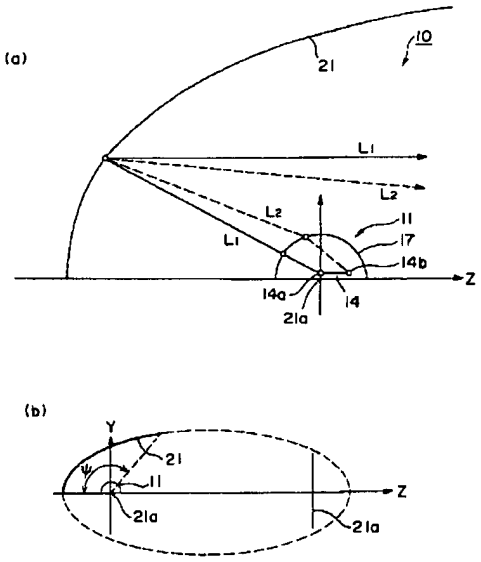
【図１】



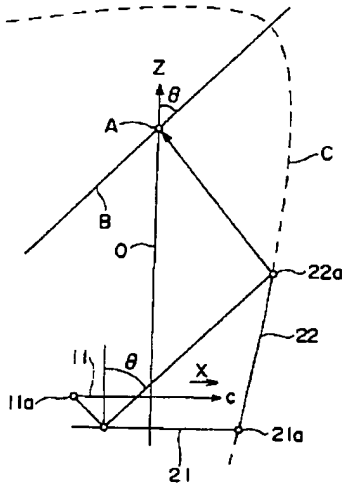
【図２】



【図３】



【図４】



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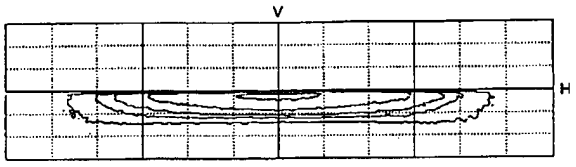

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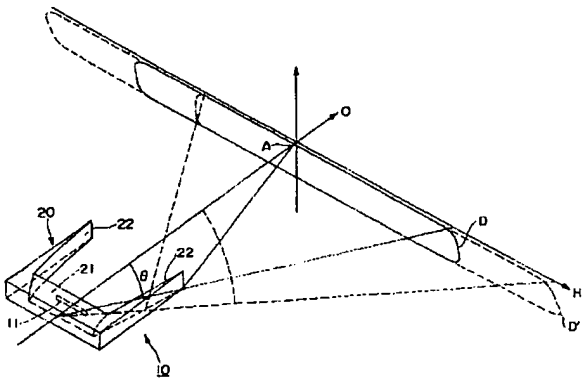
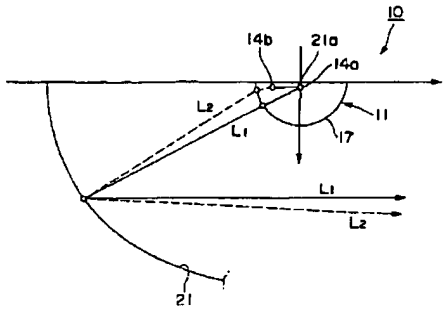
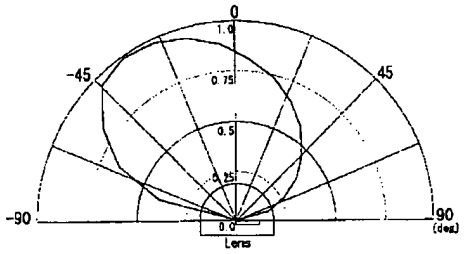

O
A
D
H
D'
20
22
21
22
θ
11
10

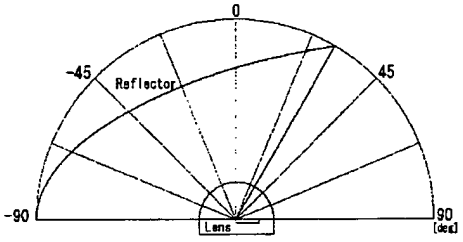
【図７】


10
14b
21a
14a
L2
L1
11
17
L1
L2
21

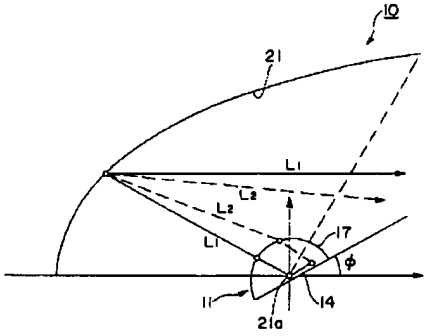
【図８】


0
1.0
0.75
0.5
0.25
0.0
-45
45
-90
90
(deg)
Lens

【図９】


0
-45
Reflector
45
-90
90
(deg)
Lens

【図１０】



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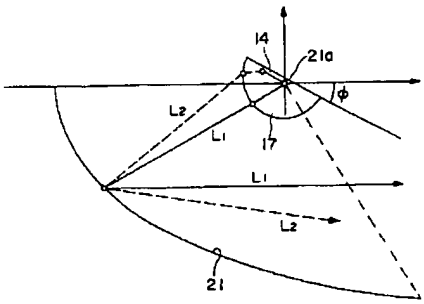

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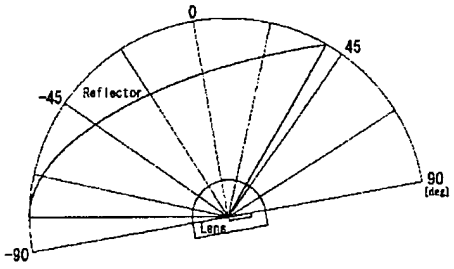

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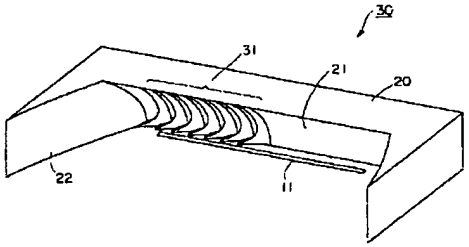

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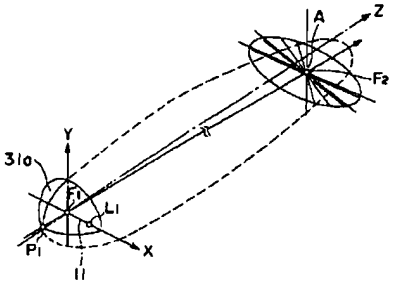

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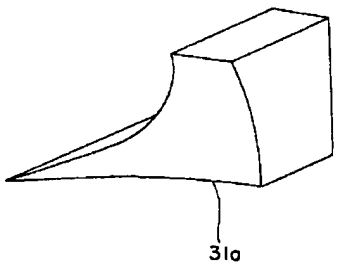

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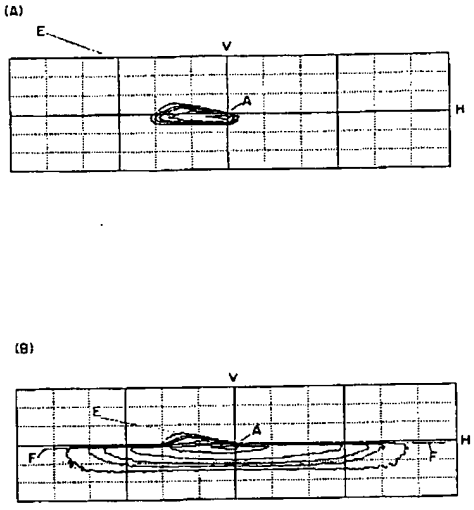

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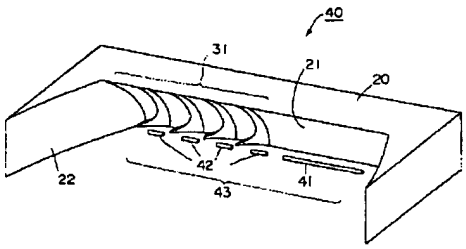

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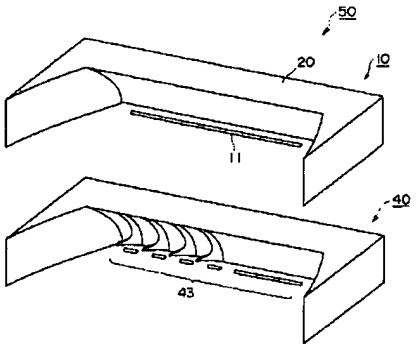

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		Ｆ２１Ｍ	3/08	Ｚ
		Ｆ２１Ｑ	1/00	Ｎ

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3K080 AA01 AB01 BA07 BC03
5F041 AA03 DA13 DA36 DA45 DA76 DA82 DB07 DC08 EE16 EE23 EE25 FF11

* NOTICES *

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2.**** shows the word which can not be translated.
3.In the drawings, any words are not translated.

CLAIMS

[Claim(s)]
[Claim 1] So that the light from the linear light source arranged so that it might extend in a longitudinal direction, and the above-mentioned linear light source may be reflected toward the front It is constituted. the reflective member arranged behind the linear light source -- since -- the above-mentioned reflective member The lighting fixture which is equipped with the first concave reflector back arranged along with the longitudinal direction of the above-mentioned linear light source, is an ellipse reflector and is characterized by arranging the above-mentioned linear light source so that it may be located near [above-mentioned] a primary focus in the cross section where the first reflector of the above is perpendicular to the longitudinal direction of a linear light source.
[Claim 2] The lighting fixture according to claim 1 to which the above-mentioned reflective member is equipped with the second reflector arranged in the field ahead of [of the first reflector] the side, and the second reflector of the above is characterized by being a parabolic reflector.
[Claim 3] The lighting fixture according to claim 1 or 2 to which the first reflector of the above is characterized by arranging the include angle from the above-mentioned linear light source within the limits of 0 times to 120 degrees.
[Claim 4] A lighting fixture given in any of claims 1-3 to which the die length of the longitudinal direction of the first reflector of the above is characterized by being 0.7 of the die length of a linear light source thru/or 1.5 times they are.
[Claim 5] A lighting fixture given in any of claims 1-4 to which the above-mentioned linear light source is equipped with the lens of the same appearance in the cross section perpendicular to a longitudinal direction, and one side edge prolonged in the longitudinal direction of the above-mentioned linear light source is characterized by being arranged at the core of the above-mentioned lens they are.
[Claim 6] the above-mentioned reflective member arranges only above an optical axis -- having -- **** -- the above-mentioned linear light source -- an optical-axis top -- facing up -- and the lighting fixture according to claim 5 to which a top Norikazu side edge is characterized by arranging the linear light source near the primary focus location of the first reflector of a reflective member, and whole from near [this] a primary focus location to the front field.
[Claim 7] the above-mentioned reflective member arranges only below an optical axis -- having -- **** -- the above-mentioned linear light source -- an optical-axis top -- facing down -- and the lighting fixture according to claim 5 to which a top Norikazu side edge is characterized by arranging the linear light source near the primary focus location of the first reflector of a reflective member, and whole from near [this] a primary focus location to the back field.
[Claim 8] The lighting fixture according to claim 6 or 7 characterized by arranging the above-mentioned linear light source so that it may incline toward back.
[Claim 9] A lighting fixture given in any of claims 1-8 which the above-mentioned reflective member is equipped with the third reflector back arranged along with the longitudinal direction of the above-mentioned linear light source, and are characterized by constituting the third reflector of the above so that light may be reflected a little in the bottom from a horizontal line on front left-hand side or front

right-hand side they are.
[Claim 10] So that the light from the linear light source arranged so that it might extend in a longitudinal direction, and the above-mentioned linear light source may be reflected toward the front It is constituted. the reflective member arranged behind the linear light source -- since -- the above-mentioned reflective member It consists of concave reflectors back arranged along with the longitudinal direction of the above-mentioned linear light source. The lighting fixture which the above-mentioned reflector is a reflector formed of the body of revolution of the conic section centering on the shaft which passes along the target point of the direction of radiation, and the point on the light source, and is characterized by being arranged so that the projection image of the above-mentioned linear light source may irradiate the field of the direction of slant rotated focusing on the target point describing above.
[Claim 11] The reflector formed of the body of revolution of the above-mentioned conic section is a rotation ellipse reflector. It is arranged so that it may be located in the target point that the primary focus is located on the above-mentioned linear light source, and a secondary focus forms the slanting exposure field ahead of the direction of the z-axis. Furthermore, the lighting fixture according to claim 10 to which only a predetermined include angle rotates a linear light source to the circumference of a revolving shaft, and the above-mentioned reflector is characterized by being constituted so that light may be reflected a little in slanting above one rather than a horizontal line in a front 1 side.
[Claim 12] A lighting fixture given in any of claims 1-11 to which the above-mentioned linear light source is characterized by being an LED array they are.
[Claim 13] A lighting fixture given in any of claims 1-11 which are characterized by the above-mentioned linear light source being the field light emitting device formed in the line they are.
[Claim 14] The lighting system which is equipped with two or more which lighting fixtures of claims 1-11, and is characterized by making the illumination light from each lighting fixture superimpose mutually.

[Translation done.]

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DETAILED DESCRIPTION

[Detailed Description of the Invention]
[0001]
[Field of the Invention] the headlight with which this invention was prepared in the anterior part of an automobile, or assistance -- it is related with the lighting fixture which used the linear light source used for the lighting fixture for cars or the various floodlights which are used as a headlight.
[0002]
[Description of the Prior Art] the main reflector in which the headlight of the former, for example, an automobile, reflects the light from the light source and the light source toward the front and which consists, for example of paraboloid of revolution, and a diffusion lens cut -- since -- it is constituted, the light from the light source is mostly changed into parallel light according to the main reflector, and the illumination light is irradiated toward the front. And as for the above-mentioned light source, bulbs, such as a halogen bulb and a electric-discharge lamp bulb, are used. Here, such a bulb is treated as the point light source in macro, although the light-emitting part is formed a line or in the shape of a rectangle in micro.
[0003]
[Problem(s) to be Solved by the Invention] By the way, that for which the lighting fixture for cars which used the linear light source uses an LED array as the so-called high mounting stop lamp is known. however, such a high mounting stop lamp is only a configuration which has arranged the LED array at the posterior part of an automobile as it is, and uses the reflected light by the reflective member -- as -- it is not constituted. For this reason, the use effectiveness of the light from the LED array which is a linear light source will become low, and exposure light will become dark. furthermore, assistance of not only the headlight of an automobile but an automobile -- in signalling lamps, such as a headlight, a tail lamp, a driving lamp, and a back-up lamp, various floodlights, etc., the lighting fixture using a linear light source is not actually used.
[0004] This invention aims at offering the lighting fixture it was made to raise the use effectiveness of the light from a linear light source by the reflective member by the easy configuration from the above point using the linear light source.
[0005]
[Means for Solving the Problem] So that the above-mentioned purpose may reflect the light from the linear light source arranged so that it might extend in a longitudinal direction, and the above-mentioned linear light source toward the front according to the first configuration of this invention It is constituted. the reflective member arranged behind the linear light source -- since -- the above-mentioned reflective member It has the first concave reflector back arranged along with the longitudinal direction of the above-mentioned linear light source. The first reflector of the above is attained by the lighting fixture which is an ellipse reflector and is characterized by arranging the above-mentioned linear light source so that it may be located near [above-mentioned] a primary focus in a cross section perpendicular to the longitudinal direction of a linear light source.
[0006] The lighting fixture by this invention is preferably equipped with the second reflector where the

above-mentioned reflective member was arranged in the field ahead of [of the first reflector] the side, and the second reflector of the above is a parabolic reflector.
[0007] The lighting fixture by this invention is desirable, and the include angle from the above-mentioned linear light source is arranged within the limits of 0 times to 120 degrees for the first reflector of the above.
[0008] The lighting fixture by this invention is desirable, and it is 0.7 of the die length of a linear light source thru/or 1.5 times the die length of the longitudinal direction of the first reflector of the above of this.
[0009] The lighting fixture by this invention is desirable, and one side edge to which the above-mentioned linear light source is equipped with the lens of the same appearance in the cross section perpendicular to a longitudinal direction, and extends in the longitudinal direction of the above-mentioned linear light source is arranged at the core of the above-mentioned lens.
[0010] the above-mentioned reflective member arranges the lighting fixture by this invention only above an optical axis preferably -- having -- **** -- the above-mentioned linear light source -- an optical-axis top -- facing up -- and the top Norikazu side edge is arranged for the linear light source near the primary focus location of the first reflector of a reflective member, and whole from near [this] the primary focus location to the front field.
[0011] the above-mentioned reflective member arranges the lighting fixture by this invention only below an optical axis preferably -- having -- **** -- the above-mentioned linear light source -- an optical-axis top -- facing down -- and the top Norikazu side edge is arranged for the linear light source near the primary focus location of the first reflector of a reflective member, and whole from near [this] the primary focus location to the back field.
[0012] Preferably, the lighting fixture by this invention is arranged so that the above-mentioned linear light source may incline toward back.
[0013] The lighting fixture by this invention is desirable, and the above-mentioned reflective member is equipped with the third reflector back arranged along with the longitudinal direction of the above-mentioned linear light source, and it is constituted so that the third reflector of the above may reflect light in the bottom a little from a horizontal line on front left-hand side or front right-hand side.
[0014] Moreover, so that the above-mentioned purpose may reflect the light from the linear light source arranged so that it might extend in a longitudinal direction, and the above-mentioned linear light source toward the front according to the second configuration of this invention It is constituted. the reflective member arranged behind the linear light source -- since -- the above-mentioned reflective member It consists of concave reflectors back arranged along with the longitudinal direction of the above-mentioned linear light source. The above-mentioned reflector is a reflector formed of the body of revolution of the conic section centering on the shaft which passes along the target point of the direction of radiation, and the point on the light source. It is attained by the lighting fixture characterized by being arranged so that the projection image of the above-mentioned linear light source may irradiate the field of the direction of slant rotated focusing on the target point describing above.
[0015] The reflector formed of the body of revolution of the above-mentioned conic section preferably the lighting fixture by this invention It is arranged so that it may be located in the target point that are a rotation ellipse reflector, and the primary focus is located on the above-mentioned linear light source, and a secondary focus forms the slanting exposure field ahead of the direction of the z-axis. Furthermore, only a predetermined include angle rotates a linear light source to the circumference of a revolving shaft, and the above-mentioned reflector is constituted so that light may be reflected a little in slanting above one rather than a horizontal line in a front 1 side.
[0016] The lighting fixture by this invention is desirable, and the above-mentioned linear light source is an LED array.
[0017] The lighting fixture by this invention is the field light emitting device by which the above-mentioned linear light source was formed in the line preferably.
[0018] Furthermore, according to this invention, the above-mentioned purpose is further equipped with two or more above-mentioned lighting fixtures, and is attained by lighting fitting on which made it make

the illumination light from each lighting fixture superimpose mutually.
[0019] According to the first configuration of the above, it will be directly reflected by the first reflector of a reflective member, and the light which carried out outgoing radiation from the linear light source and the linear light source which consists of the field light emitting device preferably formed in the LED array or the line will progress toward the front. By this, it will be reflected by the first reflector of a reflective member, and a part of light which carried out outgoing radiation from the linear light source will be irradiated toward the front, and it will illuminate a front field. Therefore, the use effectiveness of the light which carried out outgoing radiation from the linear light source will improve, and the bright illumination light will be obtained.
[0020] The above-mentioned reflective member is equipped with the second reflector arranged in the field ahead of [of the first reflector] the side, and when the second reflector of the above is a parabolic reflector It will be reflected by the second reflector and the light which progresses toward both sides in the field of the both-ends side of a linear light source among the light which carried out outgoing radiation from a linear light source and the linear light source which consists of the field light emitting device preferably formed in the LED array or the line will progress toward the front. By this, it will be reflected by the second reflector of a reflective member, and a part of light which carried out outgoing radiation from the linear light source will be irradiated toward the front, and it will illuminate a front field. Therefore, the use effectiveness of the light which carried out outgoing radiation from the linear light source will improve, and the bright illumination light will be obtained.
[0021] Since about 80% or more of light of the light in which the first reflector of the above carried out outgoing radiation from the linear light source when the include angle from the above-mentioned linear light source was arranged within the limits of 0 times to 120 degrees is reflected in the first reflector, the use effectiveness of the light which carried out outgoing radiation from the linear light source will improve further, and the brighter illumination light will be obtained.
[0022] Since it is efficiently reflected by the first reflector and the light which carried out outgoing radiation from the linear light source progresses toward the front in being 0.7 of the die length of a linear light source thru/or 1.5 times the die length of the longitudinal direction of the first reflector of the above of this, the brighter illumination light will be obtained.
[0023] The above-mentioned linear light source is equipped with the lens of the same appearance in the cross section perpendicular to a longitudinal direction, and since the light from this one side edge will carry out outgoing radiation from the core of a lens in a cross section perpendicular to a longitudinal direction when one side edge prolonged in the longitudinal direction of the above-mentioned linear light source is arranged at the core of the above-mentioned lens, it will go straight on, without receiving the refraction effectiveness of a direction perpendicular to the longitudinal direction of a lens. Therefore, the contrast of the boundary of the exposure field of the luminous-intensity-distribution pattern of light and the non-irradiating field in which it is reflected by the first reflector of a reflective member and which are irradiated toward the front becomes good. Moreover, when the lens is equipped with the same appearance about the longitudinal direction, an almost uniform luminous-intensity-distribution property will be acquired about a longitudinal direction.
[0024] The above-mentioned reflective member is arranged only above the optical axis. The above-mentioned linear light source an optical-axis top -- facing up -- and first near the focal location of the first reflector of a reflective member, and when the whole linear light source is arranged from near [this] the primary focus location to the front field, a top Norikazu side edge In case it is reflected by the first reflector and the light which carries out outgoing radiation from a linear light source progresses toward the front, it will irradiate caudad from a horizontal line.
[0025] the above-mentioned reflective member arranges only below an optical axis -- having -- **** -- the above-mentioned linear light source -- an optical-axis top -- facing down -- and in case it is reflected by the first reflector and the light a top Norikazu side edge carries out [light] outgoing radiation from a linear light source near the primary focus location of the first reflector of a reflective member and when the whole linear light source is arranged from near [this] the primary focus location to the back field progresses toward the front, it will irradiate caudad from a horizontal line.

[0026] When the above-mentioned linear light source is arranged so that it may incline toward back, the incidence effectiveness of the light which carries out incidence to the first reflector of a reflective member will improve from a linear light source, and while the illuminance by the light reflected toward the front rises, in order to obtain the same illuminance, the first reflector of a reflective member may be constituted small.
[0027] The above-mentioned reflective member is equipped with the third reflector back arranged along with the longitudinal direction of the above-mentioned linear light source. When the third reflector of the above is constituted so that light may be reflected a little in the bottom from a horizontal line on front left-hand side or front right-hand side When the light from a linear light source is irradiated on the left-hand side a little toward the front by this third reflector at the bottom, the road shoulder, a pedestrian, etc. can be illuminated.
[0028] According to the second configuration of the above, it is directly reflected by the reflector of a reflective member and the light which carried out outgoing radiation from the linear light source and the linear light source which consists of the field light emitting device preferably formed in the LED array or the line progresses toward the front. Since the light which carried out outgoing radiation from the linear light source will form by this the image of a linear light source which rotated around the optical axis when reflected by the reflector of a reflective member, when the bottom irradiates a little toward the front in 1 side (the case of left-hand traffic the case of left-hand side and right-hand traffic right-hand side), the road shoulder, a pedestrian, etc. can be illuminated as a low beam.
[0029] The reflector formed of the body of revolution of the above-mentioned conic section is a rotation ellipse reflector. It is arranged so that it may be located in the target point that the primary focus is located on the above-mentioned linear light source, and a secondary focus forms the slanting exposure field ahead of the direction of the z-axis. furthermore, when the above-mentioned reflector is constituted so that only a predetermined include angle may rotate a linear light source to the circumference of a revolving shaft and light may be reflected a little in slanting above one rather than a horizontal line in a front 1 side The light which carried out outgoing radiation from the linear light source will form the image of a linear light source which converged toward the second focus and rotated around the optical axis, when reflected by the reflector.
[0030] Furthermore, the still brighter illumination light will be obtained by having two or more above-mentioned lighting fixtures, and centralizing the illumination light from two or more lighting fixtures according to lighting fitting on which made it make the illumination light from each lighting fixture superimpose mutually.
[0031]
[Embodiment of the Invention] Hereafter, the suitable operation gestalt of this invention is explained to a detail, referring to drawing 1 thru/or drawing 19. In addition, since the operation gestalt described below is the suitable example of this invention, desirable various limitation is attached technically, but especially the range of this invention is not restricted to these modes, as long as there is no publication of the purport which limits this invention in the following explanation.
[0032] Drawing 1 shows the configuration of 1 operation gestalt which applied this invention to the lighting fixture for cars. the reflective member 20 which the lighting fixture 10 for cars is a lighting fixture which realizes from the horizontal line of the headlight of the automobile for the so-called low beams, downward luminous intensity distribution, i.e., horizontal diffusion luminous intensity distribution, in drawing 1 , and was arranged in the backside [LED array 11 as a linear light source, and LED array 11] -- since -- it is constituted.
[0033] Above-mentioned LED array 11 is constituted by putting two or more LED array modules 12 as shown in drawing 2 in order along with a longitudinal direction. The plurality mounted together with the longitudinal direction here within crevice 13a of a substrate 13 as the LED array module 12 was shown in drawing 2 , 5 [for example,], and ten LED chips 14 (in the case of illustration five pieces), the LED chip 14 -- a wrap -- the fluorescent substance layer 15 arranged like and the front face of a substrate 13 -- almost -- the whole -- a wrap -- the silicon gel 16 formed like and the surface whole of a substrate 13 -- a wrap -- the lens 17 formed like -- since -- it is constituted.

[0034] The above-mentioned LED chip 14 for example, by being constituted as blue LED of the chip size of die-length D (= 1.0mm) of one side, and making one of them contact wall surface 13b of crevice 13a By each LED chip's 14 shifting to the side, and arranging only the core of the longitudinal direction of a substrate 13 to distance D / 2, it is arranged in line by 1 side-edge 14a of the longitudinal direction along the core of the longitudinal direction of a substrate 13.
[0035] The above-mentioned fluorescent substance layer 15 consists of for example, YAG fluorescent substances, is excited by the exposure light from the LED chip 14, and carries out outgoing radiation of the white light. While the above-mentioned silicon gel 16 protects the LED chip 14 and a fluorescent substance 15, generating of the clearance between lenses 17 is prevented and it is made for the drawing effectiveness of light not to fall.
[0036] The above-mentioned lens 17 has the semicircle tubed appearance prolonged in a longitudinal direction, and it is formed so that the medial axis may be mostly in agreement with 1 side-edge 14a of each above-mentioned LED chip 14. If die length of one side of R and the LED chip 14 is set to D and a critical angle is set to alpha, the semicircle tubed radius of a lens 17 here If the internal reflection of a lens 17 is reduced, for example, it ****s to R= 2.1mm D= 1.0mm and alpha= 42.5 degrees by determining a radius R according to the following formula R>=root2.D-/sinalpha Effective light can be taken out from the LED chip 14 at about 80% of drawing effectiveness on count about the light which carries out outgoing radiation.
[0037] It has the first concave reflector 21 and the second reflector 22 established in the both sides of the first reflector 21 toward the front so that the above-mentioned reflective member 20 may reflect the light from LED array 11 and may be made to reflect it toward the front.
[0038] When the horizontal axis x directions and ahead of a lighting fixture is made into the rectangular coordinate system which makes the perpendicular vertical direction the direction of y for the longitudinal direction of LED array 11 to the direction of z, and a longitudinal direction, the first reflector 21 of the above is formed as an ellipse reflector in the cross section (it is a perpendicular cross section to the longitudinal direction of LED array 11) of yz flat surface.
[0039] Here, as the ellipse reflector was shown in the schematic diagram of drawing 3 (B), the reflector which consists of the cross-section curve which can be expressed in the elliptic curve which constitutes the ellipse which has a primary focus (F1) and a secondary focus (F2) in the direction of z, i.e., the curve of the locus of the point P which is fixed on 1 flat surface, is said. However, in this specification, as an ellipse reflector, although it is not in agreement not only with the ellipse reflector in a narrow sense mentioned above but the elliptic curve which has a primary focus and a secondary focus strictly, the reflector which consists of the cross-section curve which can be approximated to this ellipse cross section is also included. Therefore, the primary focus and secondary focus of an elliptic curve which also approximate a primary focus and a secondary focus not only to the primary focus in the cross-section curve which can be realized by the elliptic curve and a secondary focus in a narrow sense but to each reflector are included.
[0040] Moreover, when an include angle parallel to the luminescence side of LED array 11 is made into 0 times, the first reflector 21 of the above is formed so that an include angle psi may enter within the limits of 0 times to 120 degrees. In addition, in drawing 1 , it is formed in the so-called Quonset so that it may have the same configuration also in which yz flat-surface cross section, but the first reflector 21 may be formed so that it may have curvature not only about this but about x directions.
[0041] And so that the first focal location 21a may be located near the core of the lens 17 of LED array 11 arranged upward, as the first reflector 21 is shown in drawing 3 (A) Moreover, it is arranged and he is trying to satisfy the regulation as a headlight so that second focal location 21b may be caudad located about 0.5 degrees from the optical axis O (z-axis) on the screen of first focal location 21a, for example, the front of 25m. Here, as shown in drawing 3 , above-mentioned LED array 11 is arranged so that the whole may be ahead located by 1 side-edge 14a of the LED chip 14 from first focal location 21a in accordance with first focal location 21a of the first reflector 21.
[0042] By this 1 side-edge 14a of each LED chip 14 of LED array 11 It is located near [focal location 21a / of the first reflector 21] the first along the core of a lens 17. Since each LED chip 14 whole is

ahead arranged from this first focal location 21a, the light L1 which carried out outgoing radiation from one side edge 14a of each LED chip 14 Without receiving the refraction operation in yz flat-surface cross section of a lens 17, it will be reflected by the first reflector 21 and will progress toward second focal location 21b.

[0043] Moreover, since each whole LED chip 14 is arranged so that it may be ahead located rather than 1 side-edge 14a, after being refracted with a lens 17, it is reflected by the first reflector 21, and rather than light L1, the light from the LED chip 14 will go caudad, and will progress. For example, the light L2 which carried out outgoing radiation from other side edges which become a front side most is always reflected downward rather than second focal location 21b. Therefore, toward the front, rather than second focal location 21b below a horizontal line, the light which carried out outgoing radiation from the LED chip 14 and the fluorescent substance layer 15, and was reflected in the first reflector 21 goes caudad, and is irradiated. Since the light L1 which carried out outgoing radiation from one side edge 14a of the LED chip 14 do not receive the refraction operation in a perpendicular cross section (yz flat surface) to the longitudinal direction (x directions) of a lens 17 at this time , the boundary of the exposure field and the non-irradiating field in the horizontal line of the light in which it be reflect in the first reflector 21 and which be irradiate toward the front below at a horizontal line be irradiate , and , thereby , contrast become good .

[0044] On the other hand, the second reflector 22 of the reflective member 20 is formed as a parabolic reflector at xz flat surface (cross section perpendicular to a longitudinal direction and the direction of an optical axis), as shown in drawing 4 . Here, with a parabolic reflector, this specification is defined as a parabolic reflector including the false parabolic curve reflector which consists of the Bezier curve which does not have the shaft of a parabolic curve strictly, although the reflector which can be approximated not only to the parabolic reflector which serves as a cross-section curve which can be expressed in a parabolic curve in the vertical section of a reflector but to this paraboloid, for example, a parabolic curve, is especially resembled as long as there is no notice. The above-mentioned parabolic reflector on both sides (only the 1 side is shown by drawing 4) of the first reflector 21 The light of the maximum diffusion angle theta (for example, 45 degrees) which carried out outgoing radiation from edge 11a of the opposite side of LED array 11, and was reflected by the first reflector 21 is reflected. So that it may irradiate toward the target point for obtaining a predetermined luminous-intensity-distribution pattern on a front screen For example, the point under about 0.5 degrees (refer to drawing 5) is made into a focal location on the screen of the target point A, for example, the front of 25m, just under a medial axis O (z-axis). It consists of parabolas C which make the starting point further edge 21a by the side of one of the first reflector 21 centering on the shaft B with which only the include angle theta inclined from the target point A to the medial axis O, the sweep of the parabola C concerned was carried out in the direction of y, i.e., it is considering as the reflector where Parabola C appears in xz flat-surface cross section.

[0045] And terminal point 22a of the above-mentioned parabolic reflector is taken as the paraboloid-of-revolution reflector which rotated Parabola C centering on Shaft B as a location as for which the light of the maximum diffusion angle theta which carried out outgoing radiation from the edge of the opposite side of LED array 11, and was reflected by the first reflector 21 carries out incidence. Thereby, it is reflected by the second reflector 22, and is reflected downward [almost level] toward the target point A, and the light diffused the include angle more than the maximum diffusion angle theta from LED array 11 raises the illuminance near a core.

[0046] The lighting fixture 10 for cars by this invention operation gestalt is constituted as mentioned above, and the light which carried out outgoing radiation from LED array 11 is irradiated toward the front by being reflected in the first reflector 21 and second reflector 22 of the reflective member 20 by electric power's being supplied by the drive circuit which each LED chip 14 of LED array 11 does not illustrate, and emitting light.

[0047] being controlled about a perpendicular direction based on the configuration of the first reflector 21, in case it is reflected by the first reflector 21 of a reflective member, as the light which carried out outgoing radiation from LED array 11 is shown in drawing 5 here -- a horizontal line H -- small -- downward exposure field D' -- it goes and irradiates. Moreover, the light irradiated toward the part of the

light reflected by the first reflector 21 and the both ends of exposure field D' Are reflected by the second reflector 22, and based on the configuration of the second reflector 22, it is related horizontally and controlled. The light equivalent to the both-ends field of exposure field D' by the first reflector 21 irradiates the field of the lower part of a medial axis O, makes the illuminance of a core brighter, and forms the exposure field D restricted to the maximum diffusion angle theta as a whole. The luminous-intensity-distribution pattern which fitted the horizontal diffusion luminous intensity distribution in the so-called low beam as shown in drawing 6 by this will be obtained.

[0048] In addition, although, as for LED array 11, the reflective member 20 is arranged in the lighting fixture 10 for cars mentioned above at the optical-axis O bottom by arranging the LED chip 14 on an optical axis O at the top face of a substrate 13, i.e., facing up As shown not only in this but in drawing 7 , LED array 11 is arranged downward on an optical axis O, and the reflective member 20 may be made to be arranged at the optical-axis O bottom. In this case, LED array 11 is arranged so that the whole may be located more back than first focal location 21a by 1 side-edge 14a of that LED chip 14 in accordance with first focal location 21a of the first reflector 21. By this, like the case of the arrangement shown in drawing 3 , when reflected by the first reflector 21 of the reflective member 20, the light which carried out outgoing radiation from LED array 11 will go caudad, and will be irradiated more slightly than an optical axis O.

[0049] In addition, the light which generally carries out outgoing radiation from an LED chip has directional characteristics. When the line light source arranged so that it may align in the location from which other side edges separated from the core of a lens 17 is used so that 1 side-edge 14a of each LED chip 14 of LED array 11 may be mostly in agreement with the medial axis of a lens 17 and as mentioned above, the side to which the directional characteristics of LED array 11 shifted the LED chip 14 as shown in drawing 8 R> 8 shows the directional characteristics which inclined in the opposite direction (it is a left at drawing 8). In addition, in drawing 8 , the direction of a normal is made into 0 times, a left is made into the minus direction and the method of the right is made into the plus direction. And the first reflector 21 mentioned later is arranged to the direction of radiation, i.e., a drawing left, so that the light of the medial axis of these inclined directional characteristics may be reflected. Here, in order to miniaturize the whole lighting fixture, it is desirable [it is high in the use effectiveness of light and] to determine the magnitude of the lens 17 for which it asked according to the LED chip size and the formula 1 mentioned above so that it may become the LED light source of magnitude which is located in the range whose medial axes of the directional characteristics of an LED array are 20 thru/or 50 degrees.

[0050] Furthermore, if the first reflector 21 is made into at least 0 thru/or the range of 100 degrees as shown in drawing 9 , it can raise the use effectiveness over the light irradiated from LED array 11 equipped with the directional characteristics shown in drawing 8 mentioned above. If it is desirable to arrange practical so that 60% or more of light can be effectively reflected among the light from the above-mentioned linear light source and it makes the first reflector 21 0 thru/or the range of 120 degrees, it will become possible to reflect effectively about 80% or more of light in the direction of a cross section of the first reflector 21.

[0051] Furthermore, in the lighting fixture 10 for cars mentioned above, as shown in drawing 3 or drawing 7 , LED array 11 is arranged so that the front face of the substrate 13 may extend in accordance with an optical axis O, but as are shown not only in this but in drawing 10 or drawing 11 , and shown in the tilt angle phi, for example, drawing 10 , or drawing 12 toward back to an optical axis O, it inclines and it may be arranged only 10 degrees. It becomes possible to increase the light L which carried out outgoing radiation from LED array 11 reflected in these cases in the first reflector 21, will be reflected more efficiently in the first reflector 21 and second reflector 22 of the reflective member 20, and will irradiate toward the front, and the illuminance of a luminous-intensity-distribution pattern will improve. Therefore, in order to obtain the same illuminance, the reflective member 20 may be constituted small.

[0052] Drawing 13 shows the configuration of the second operation gestalt of the lighting fixture for cars by this invention. In drawing 13 , the lighting fixture 30 for cars is the headlight of the automobile for the so-called low beams, since it is the almost same configuration as the lighting fixture 10 for cars

shown in drawing 1 thru/or drawing 4 , gives the same sign to the same component part, and omits the explanation.

[0053] The above-mentioned lighting fixture 30 for cars has different composition in that the reflective member 20 is further equipped with the third reflector 31 in addition to the first reflector 21 and second reflector 22. The third reflector 31 of the above is arranged to the field between the first reflector 21 and the second reflector 22, as shown in drawing 13 .

[0054] The third reflector 31 of the above is constituted as a compound reflector which consists of two or more reflectors, and each reflector 31a consists of ellipsoids of revolution. Each reflector 31a by reflecting the light from LED array 11 So that a lower part may be irradiated on the left-hand side from the target point A from the line E of 15 Hidari risers (refer to drawing 14 (A)) The light which it is formed and carried out outgoing radiation along this cut-off line E from one side edge 14a of each LED chip 14 of a linear light source 11 It goes on without receiving a refraction operation of a lens 17, and contrast of the boundary of the exposure field of a luminous-intensity-distribution pattern and a non-irradiating field can be made clear along the cut-off line E.

[0055] Here, the third reflector 31 of the above is explained, referring to drawing 15 and drawing 16 . As shown in drawing 15 , it asks for the elliptic curve which makes the point on a linear light source 11 a primary focus F1, and uses the target point A of the direction of -y as a secondary focus F2 only about 0.5 degrees [z-axis] on the screen ahead of 25m. An elliptic curve is rotated by setting a revolving shaft as the straight line which connects F1 and F2, and an ellipsoid of revolution is created. Thus, in the reflector which consists of the obtained ellipsoid of revolution, focusing on the point F2 that the primary focus F1 was projected on the screen, the projection image by the linear light source 11 rotates, and is acquired. A part of rotation ellipse reflector which irradiates the field of the range to the line E of 15 Hidari risers using the property which this light source image rotates is set to reflector 31a. Thus, the configuration of the acquired rotation ellipse reflector is shown in drawing 16 . In drawing 16 , a front field is rotation ellipse reflector 31a. In addition, in drawing 15 , although the example at the time of setting the location of the central point of a linear light source 11 to F1 is shown in order to make explanation easy to understand, in each reflector 31a, it is the location of the arbitration on a linear light source 11 instead of the central point on a linear light source 11, and each reflector 31a is formed, using as F1 the location corresponding to the light source reflected in each reflector, respectively. Thereby, as shown in drawing 14 (A), the luminous-intensity-distribution pattern caudad irradiated from the line E of 15 Hidari risers on the left-hand side can be obtained from the target point A.

[0056] According to the lighting fixture 30 for cars of such a configuration, like the lighting fixture 10 for cars mentioned above, it is reflected by the first reflector 21 and second reflector 22 of the reflective member 20, and by irradiating toward the front, the light which carried out outgoing radiation from LED array 11 will form the horizontal diffusion luminous-intensity-distribution pattern which spread in the lower part more slightly than the same horizontal line H, if shown in drawing 6 . Furthermore, when the light from LED array 11 is reflected by the third reflector 31 of the reflective member 20 and the left-hand side slanting upper part irradiates a little toward the front, as shown in drawing 14 R> 4 (A), a lower part is irradiated a little than a horizontal line H from the line E of 15 Hidari risers with the up side in the target point A to left-hand side.

[0057] Therefore, as shown in drawing 14 (B), the luminous-intensity-distribution pattern with which it was superimposed on the luminous-intensity-distribution pattern of drawing 14 (A) formed more nearly caudad than 15 left risers is formed a little on the screen ahead of a lighting fixture from a horizontal line H at the bottom on an optical axis O to the luminous-intensity-distribution pattern of drawing 6 formed caudad more slightly than a horizontal line H, and left-hand side. Thereby, when the lighting fixture 30 for cars is carried, in the core of an exposure field, it is superimposed on the exposure light by the reflectors of a reflector 21, a reflector 22, and a reflector 31, and a high illuminance can be obtained. Thus, since the curbstone of the road shoulder, a pedestrian, a road sign, etc. are brightly illuminated on the left-hand side of [front] an automobile, the safety of the car of left-hand traffic can be secured further. Moreover, since the cut-off line F of the direction of a horizontal line which is the boundary of an exposure field and a non-irradiating field, and the cut-off line E of upper left slant become clear,

dazzling light etc. can be reduced.
[0058] In addition, what is necessary is just to consider as 15 upward slants to the right with this operation gestalt, in the case of right-hand traffic, although he is trying to illuminate a lower part from the line E of 15 front left risers. Moreover, although the slanting exposure field is formed according to the reflector which consists of an elliptic curve, the rotation reflector which used not only an elliptic curve but other conic sections may be adopted. However, in the case of a rotation ellipse reflector, the luminous-intensity-distribution pattern of condensing nature can be obtained easily, but it is desirable in the case of other conic sections, to use an elliptic curve as the conic section, since it is easy to become the luminous-intensity-distribution pattern of diffusibility.
[0059] Drawing 17 shows the configuration of the third operation gestalt of the lighting fixture for cars by this invention. In drawing 17 , the lighting fixture 40 for cars is the headlight of the automobile for the so-called low beams, since it is the almost same configuration as the lighting fixture 30 for cars explained with the second operation gestalt, gives the same sign to the same component part, and omits the explanation.
[0060] The front-like light source section 41 by which, as for the above-mentioned lighting fixture 40 for cars, the linear light source 43 has been arranged ahead of the first reflector 21, It has composition which is different only at the point constituted. the second linear light source section 42 arranged ahead of the third reflector 31 -- since -- a linear light source 43 As mentioned above, it is arranged in line by one side edge of the longitudinal direction along the core of the longitudinal direction of a substrate by an LED chip's shifting to the side and arranging only the core of the longitudinal direction of a substrate to distance D / 2.
[0061] As shown in drawing 17 , the second linear light source section 42 is arranged corresponding to each reflector 31a of the third reflector 31 which consists of a compound reflector, and is not formed in the field between each reflector 31a. The second linear light source section 42 is reflected by each reflector 31, without the light which carried out outgoing radiation receiving a refraction operation of a direction perpendicular to the longitudinal direction of a lens 17 from one side edge of an LED chip. each reflector 31a and every -- As the reflected light irradiates the cut-off line E of 15 front left risers shown in drawing 14 (A), the light which carried out outgoing radiation from the second linear light source section 42 irradiates the lower part of the cut-off line E. Each second linear light source section 42 arranged corresponding to each reflector 31a of the third reflector 31 restricts the exposure width of face in the direction of slant only to a predetermined field 15 degrees, and he is trying for the light which irradiates the upper part or a lower part extremely not to produce it by controlling that die length suitably at this time.
[0062] It is made to be the same as that of the lighting fixture 30 for cars mentioned above according to the lighting fixture 40 for cars of such a configuration. While being able to form the luminous-intensity-distribution pattern suitable for the headlight of the automobile for the so-called low beams as shown in drawing 14 (B) and raising the formation effectiveness of the luminous-intensity-distribution pattern by the linear light source 41 By not forming in the field corresponding to between each reflector of the third reflector 31 of the second linear light source section 42, installation and power consumption of the light source of the part can be reduced, and cost can be reduced. In addition, although it is also possible to form the front-like light source section 41 and each second linear light source section 42 in an exception object, respectively, as for a linear light source 43, in LED array 11 mentioned above, it is desirable to unify mutually and to constitute, as the LED chip 16 corresponding to a nonluminescent field is not arranged.
[0063] Drawing 18 shows the configuration of the fourth operation gestalt of the lighting fixture for cars by this invention. In drawing 18 , the lighting fixture 50 for cars is the headlight of the automobile for the so-called low beams, on the lighting fixture 10 for cars shown by drawing 1 , since it is the configuration of having piled up the lighting fixture 30 for cars shown in drawing 13 R> 3, gives the same sign to the same component part, and omits the explanation.
[0064] The luminous-intensity-distribution pattern shown in drawing 6 which spreads to a downward field more slightly [according to the lighting fixture 50 for cars of such a configuration] than the

horizontal line H by the lighting fixture 10 for cars mentioned above, It is made for the luminous-intensity-distribution pattern shown in drawing 14 (B) which has the cut-off line E Hidari slanting above [by the lighting fixture 30 for cars] and the direction cut-off line F of a horizontal line to lap from the cut-off line F in a downward location. By installing each lighting fixture unit, the luminous-intensity-distribution pattern of a higher illuminance can be obtained.

[0065] In addition, in order to obtain a desired luminous-intensity-distribution pattern and brightness, still more nearly another lighting fixture unit may be used, or the exposure field of the compound reflector in each lighting fixture unit may be combined with a proper rate, or the exposure field by each lighting fixture **** is restricted to the proper range, and you may make it obtain predetermined luminous intensity distribution with the combination of two or more lighting fixture units. When using two or more lighting fixture units, it may install not only in what is installed up and down but in right and left side by side, or you may make it combine the lighting fixture unit from which magnitude differs.

[0066] In the operation gestalt mentioned above, although the LED module 12 which constitutes LED array 11 is equipped with the semicircle tubed lens 17, it may be equipped with the wrap semi-sphere-like lens not only for this but for each LED chip 14. however, when it is going to obtain the luminous-intensity-distribution pattern which spreads in a direction almost parallel to a light source longitudinal direction If it carries out to a lens with which the same cross-section configuration appears in a perpendicular cross section to a longitudinal direction, for example, the lens configuration which a semicircle ball makes carry out the parallel displacement of the curve approximated to this toward a longitudinal direction, and appears Since the light which carried out outgoing radiation from the LED chip shows the same diffusion in a longitudinal direction, it becomes easy to obtain uniform luminous intensity distribution in a direction almost parallel to a light source longitudinal direction, and is desirable. In addition, when the false ellipse reflector and false parabolic reflector which are approximated to each reflector are used as an ellipse reflector and a parabolic reflector in the operation gestalt mentioned above, the luminous-intensity-distribution pattern mentioned above becomes a different thing strictly, but since the luminous-intensity-distribution pattern by the ellipse reflector or parabolic reflector to approximate and the approximated luminous-intensity-distribution pattern are obtained, a problem can use such an approximation side practically within limits not becoming.

[0067] Moreover, the reflector which consists of the cross-section curve which can be expressed in the elliptic curve which constitutes the ellipse which has a primary focus and a secondary focus in the direction of z so that it may be easy to understand in explanation of the operation gestalt mentioned above, And although explained based on the ellipse reflector including the reflector which consists of the cross-section curve which can be approximated to this ellipse cross section although it is not in agreement with the elliptic curve which has a primary focus and a secondary focus strictly That for which the cross-section configuration used the secondary rational Bezier curve (= conic section) is said to a wide sense. The reflector which can be expressed by the definition of the ellipse reflector containing the curve which approximated the conic section by free form curve like NURBS (Hiroshi Toritani work; foundation and application; of three dimensional CAD KYORITSU SHUPPAN Co., Ltd. issue) can also be used. For example, if the contrast of the boundary of the exposure field and the non-irradiating field by the lighting fixture is emphasized Although it is desirable to consider as an ellipse reflector in a narrow sense, the reflector shown exaggeratingly yz cross-section configuration which combined two or more conic sections as shown in drawing 19 (A), It can have yz cross-section configuration which used the free form curve which has point of inflection as shown in drawing 19 (B), and can also carry out to the reflector which carried out the sweep of the cross-section curve which starts in the x directions as it was, i.e., the reflector where all the cross sections in yz flat surface serve as the same cross-section curve. All the loci of the beam of light which can be set horizontally become the same from it being the reflector which carried out the sweep in the x directions, if these reflectors are used, it sets horizontally and an almost uniform luminous-intensity-distribution pattern is obtained, about the vertical direction, the reflective pattern which prepared roughness and fineness in distribution of a reflected ray locus based on the illustrated reflector is obtained, and the operation gestalt which used such a reflector is also

included by the invention in this application.
[0068] Furthermore, in the operation gestalt mentioned above, although the pedestal as an LED array which installed two or more LED chips was used, field light emitting devices, such as EL (electroluminescence devices) extended and formed in the longitudinal direction, may be used as the light source. Moreover, although the linear light sources 11 and 30 for lighting fixtures used for the lighting fixture 10 for cars as a headlight for the low beams of an automobile were explained Not only this but this invention A headlight, or the auxiliary LGTs for automobiles (the fog lamp, the driving lamp, back-up lamp, etc.) and the signalling lamp for automobiles (the tail lamp, the turn lamp, stop lamp, etc.) for main beams of an automobile, Or it is clear that this invention can be applied to the linear light source for lighting fixtures for using it for various lighting fixtures, such as traffic lights other than for automobiles (for example, a traffic sign LGT), a general lighting LGT, a pendent light, a common annunciator, and a common signalling lamp.
[0069]
[Effect of the Invention] As stated above, according to this invention, it will be directly reflected by the first reflector of a reflective member, and the light which carried out outgoing radiation from the linear light source and the linear light source which consists of the field light emitting device preferably formed in the LED array or the line will progress toward the front. By this, it will be reflected by the first reflector of a reflective member, and a part of light which carried out outgoing radiation from the linear light source will be irradiated toward the front, and it will illuminate a front field. Therefore, the use effectiveness of the light which carried out outgoing radiation from the linear light source will improve, and the bright illumination light will be obtained.
[0070] Thus, according to this invention, the extremely excellent lighting fixture it was made to raise the use effectiveness of the light from a linear light source by the reflective member may be offered by the easy configuration using a linear light source.

[Translation done.]

* NOTICES *

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TECHNICAL FIELD

[Field of the Invention] the headlight with which this invention was prepared in the anterior part of an automobile, or assistance -- it is related with the lighting fixture which used the linear light source used for the lighting fixture for cars or the various floodlights which are used as a headlight.

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PRIOR ART

[Description of the Prior Art] the main reflector in which the headlight of the former, for example, an automobile, reflects the light from the light source and the light source toward the front and which consists, for example of paraboloid of revolution, and a diffusion lens cut -- since -- it is constituted, the light from the light source is mostly changed into parallel light according to the main reflector, and the illumination light is irradiated toward the front. And as for the above-mentioned light source, bulbs, such as a halogen bulb and a electric-discharge lamp bulb, are used. Here, such a bulb is treated as the point light source in macro, although the light-emitting part is formed a line or in the shape of a rectangle in micro.

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EFFECT OF THE INVENTION

[Effect of the Invention] As stated above, according to this invention, it will be directly reflected by the first reflector of a reflective member, and the light which carried out outgoing radiation from the linear light source and the linear light source which consists of the field light emitting device preferably formed in the LED array or the line will progress toward the front. By this, it will be reflected by the first reflector of a reflective member, and a part of light which carried out outgoing radiation from the linear light source will be irradiated toward the front, and it will illuminate a front field. Therefore, the use effectiveness of the light which carried out outgoing radiation from the linear light source will improve, and the bright illumination light will be obtained.
[0070] Thus, according to this invention, the extremely excellent lighting fixture it was made to raise the use effectiveness of the light from a linear light source by the reflective member may be offered by the easy configuration using a linear light source.

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TECHNICAL PROBLEM

[Problem(s) to be Solved by the Invention] By the way, that for which the lighting fixture for cars which used the linear light source uses an LED array as the so-called high mounting stop lamp is known. however, such a high mounting stop lamp is only a configuration which has arranged the LED array at the posterior part of an automobile as it is, and uses the reflected light by the reflective member -- as -- it is not constituted. For this reason, the use effectiveness of the light from the LED array which is a linear light source will become low, and exposure light will become dark. furthermore, assistance of not only the headlight of an automobile but an automobile -- in signalling lamps, such as a headlight, a tail lamp, a driving lamp, and a back-up lamp, various floodlights, etc., the lighting fixture using a linear light source is not actually used.
[0004] This invention aims at offering the lighting fixture it was made to raise the use effectiveness of the light from a linear light source by the reflective member by the easy configuration from the above point using the linear light source.

[Translation done.]

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MEANS

[Means for Solving the Problem] So that the above-mentioned purpose may reflect the light from the linear light source arranged so that it might extend in a longitudinal direction, and the above-mentioned linear light source toward the front according to the first configuration of this invention It is constituted. the reflective member arranged behind the linear light source -- since -- the above-mentioned reflective member It has the first concave reflector back arranged along with the longitudinal direction of the above-mentioned linear light source. The first reflector of the above is attained by the lighting fixture which is an ellipse reflector and is characterized by arranging the above-mentioned linear light source so that it may be located near [above-mentioned] a primary focus in a cross section perpendicular to the longitudinal direction of a linear light source.
[0006] The lighting fixture by this invention is preferably equipped with the second reflector where the above-mentioned reflective member was arranged in the field ahead of [of the first reflector] the side, and the second reflector of the above is a parabolic reflector.
[0007] The lighting fixture by this invention is desirable, and the include angle from the above-mentioned linear light source is arranged within the limits of 0 times to 120 degrees for the first reflector of the above.
[0008] The lighting fixture by this invention is desirable, and it is 0.7 of the die length of a linear light source thru/or 1.5 times the die length of the longitudinal direction of the first reflector of the above of this.
[0009] The lighting fixture by this invention is desirable, and one side edge to which the above-mentioned linear light source is equipped with the lens of the same appearance in the cross section perpendicular to a longitudinal direction, and extends in the longitudinal direction of the above-mentioned linear light source is arranged at the core of the above-mentioned lens.
[0010] the above-mentioned reflective member arranges the lighting fixture by this invention only above an optical axis preferably -- having -- **** -- the above-mentioned linear light source -- an optical-axis top -- facing up -- and the top Norikazu side edge is arranged for the linear light source near the primary focus location of the first reflector of a reflective member, and whole from near [this] the primary focus location to the front field.
[0011] the above-mentioned reflective member arranges the lighting fixture by this invention only below an optical axis preferably -- having -- **** -- the above-mentioned linear light source -- an optical-axis top -- facing down -- and the top Norikazu side edge is arranged for the linear light source near the primary focus location of the first reflector of a reflective member, and whole from near [this] the primary focus location to the back field.
[0012] Preferably, the lighting fixture by this invention is arranged so that the above-mentioned linear light source may incline toward back.
[0013] The lighting fixture by this invention is desirable, and the above-mentioned reflective member is equipped with the third reflector back arranged along with the longitudinal direction of the above-mentioned linear light source, and it is constituted so that the third reflector of the above may reflect light in the bottom a little from a horizontal line on front left-hand side or front right-hand side.

[0014] Moreover, so that the above-mentioned purpose may reflect the light from the linear light source arranged so that it might extend in a longitudinal direction, and the above-mentioned linear light source toward the front according to the second configuration of this invention It is constituted. the reflective member arranged behind the linear light source -- since -- the above-mentioned reflective member It consists of concave reflectors back arranged along with the longitudinal direction of the above-mentioned linear light source. The above-mentioned reflector is a reflector formed of the body of revolution of the conic section centering on the shaft which passes along the target point of the direction of radiation, and the point on the light source. It is attained by the lighting fixture characterized by being arranged so that the projection image of the above-mentioned linear light source may irradiate the field of the direction of slant rotated focusing on the target point describing above.
[0015] The reflector formed of the body of revolution of the above-mentioned conic section preferably the lighting fixture by this invention It is arranged so that it may be located in the target point that are a rotation ellipse reflector, and the primary focus is located on the above-mentioned linear light source, and a secondary focus forms the slanting exposure field ahead of the direction of the z-axis. Furthermore, only a predetermined include angle rotates a linear light source to the circumference of a revolving shaft, and the above-mentioned reflector is constituted so that light may be reflected a little in slanting above one rather than a horizontal line in a front 1 side.
[0016] The lighting fixture by this invention is desirable, and the above-mentioned linear light source is an LED array.
[0017] The lighting fixture by this invention is the field light emitting device by which the above-mentioned linear light source was formed in the line preferably.
[0018] Furthermore, according to this invention, the above-mentioned purpose is further equipped with two or more above-mentioned lighting fixtures, and is attained by lighting fitting on which made it make the illumination light from each lighting fixture superimpose mutually.
[0019] According to the first configuration of the above, it will be directly reflected by the first reflector of a reflective member, and the light which carried out outgoing radiation from the linear light source and the linear light source which consists of the field light emitting device preferably formed in the LED array or the line will progress toward the front. By this, it will be reflected by the first reflector of a reflective member, and a part of light which carried out outgoing radiation from the linear light source will be irradiated toward the front, and it will illuminate a front field. Therefore, the use effectiveness of the light which carried out outgoing radiation from the linear light source will improve, and the bright illumination light will be obtained.
[0020] The above-mentioned reflective member is equipped with the second reflector arranged in the field ahead of [of the first reflector] the side, and when the second reflector of the above is a parabolic reflector It will be reflected by the second reflector and the light which progresses toward both sides in the field of the both-ends side of a linear light source among the light which carried out outgoing radiation from a linear light source and the linear light source which consists of the field light emitting device preferably formed in the LED array or the line will progress toward the front. By this, it will be reflected by the second reflector of a reflective member, and a part of light which carried out outgoing radiation from the linear light source will be irradiated toward the front, and it will illuminate a front field. Therefore, the use effectiveness of the light which carried out outgoing radiation from the linear light source will improve, and the bright illumination light will be obtained.
[0021] Since about 80% or more of light of the light in which the first reflector of the above carried out outgoing radiation from the linear light source when the include angle from the above-mentioned linear light source was arranged within the limits of 0 times to 120 degrees is reflected in the first reflector, the use effectiveness of the light which carried out outgoing radiation from the linear light source will improve further, and the brighter illumination light will be obtained.
[0022] Since it is efficiently reflected by the first reflector and the light which carried out outgoing radiation from the linear light source progresses toward the front in being 0.7 of the die length of a linear light source thru/or 1.5 times the die length of the longitudinal direction of the first reflector of the above of this, the brighter illumination light will be obtained.

[0023] The above-mentioned linear light source is equipped with the lens of the same appearance in the cross section perpendicular to a longitudinal direction, and since the light from this one side edge will carry out outgoing radiation from the core of a lens in a cross section perpendicular to a longitudinal direction when one side edge prolonged in the longitudinal direction of the above-mentioned linear light source is arranged at the core of the above-mentioned lens, it will go straight on, without receiving the refraction effectiveness of a direction perpendicular to the longitudinal direction of a lens. Therefore, the contrast of the boundary of the exposure field of the luminous-intensity-distribution pattern of light and the non-irradiating field in which it is reflected by the first reflector of a reflective member and which are irradiated toward the front becomes good. Moreover, when the lens is equipped with the same appearance about the longitudinal direction, an almost uniform luminous-intensity-distribution property will be acquired about a longitudinal direction.
[0024] The above-mentioned reflective member is arranged only above the optical axis. The above-mentioned linear light source an optical-axis top -- facing up -- and first near the focal location of the first reflector of a reflective member, and when the whole linear light source is arranged from near [this] the primary focus location to the front field, a top Norikazu side edge In case it is reflected by the first reflector and the light which carries out outgoing radiation from a linear light source progresses toward the front, it will irradiate caudad from a horizontal line.
[0025] the above-mentioned reflective member arranges only below an optical axis -- having -- **** -- the above-mentioned linear light source -- an optical-axis top -- facing down -- and in case it is reflected by the first reflector and the light a top Norikazu side edge carries out [light] outgoing radiation from a linear light source near the primary focus location of the first reflector of a reflective member and when the whole linear light source is arranged from near [this] the primary focus location to the back field progresses toward the front, it will irradiate caudad from a horizontal line.
[0026] When the above-mentioned linear light source is arranged so that it may incline toward back, the incidence effectiveness of the light which carries out incidence to the first reflector of a reflective member will improve from a linear light source, and while the illuminance by the light reflected toward the front rises, in order to obtain the same illuminance, the first reflector of a reflective member may be constituted small.
[0027] The above-mentioned reflective member is equipped with the third reflector back arranged along with the longitudinal direction of the above-mentioned linear light source. When the third reflector of the above is constituted so that light may be reflected a little in the bottom from a horizontal line on front left-hand side or front right-hand side When the light from a linear light source is irradiated on the left-hand side a little toward the front by this third reflector at the bottom, the road shoulder, a pedestrian, etc. can be illuminated.
[0028] According to the second configuration of the above, it is directly reflected by the reflector of a reflective member and the light which carried out outgoing radiation from the linear light source and the linear light source which consists of the field light emitting device preferably formed in the LED array or the line progresses toward the front. Since the light which carried out outgoing radiation from the linear light source will form by this the image of a linear light source which rotated around the optical axis when reflected by the reflector of a reflective member, when the bottom irradiates a little toward the front in 1 side (the case of left-hand traffic the case of left-hand side and right-hand traffic right-hand side), the road shoulder, a pedestrian, etc. can be illuminated as a low beam.
[0029] The reflector formed of the body of revolution of the above-mentioned conic section is a rotation ellipse reflector. It is arranged so that it may be located in the target point that the primary focus is located on the above-mentioned linear light source, and a secondary focus forms the slanting exposure field ahead of the direction of the z-axis. furthermore, when the above-mentioned reflector is constituted so that only a predetermined include angle may rotate a linear light source to the circumference of a revolving shaft and light may be reflected a little in slanting above one rather than a horizontal line in a front 1 side The light which carried out outgoing radiation from the linear light source will form the image of a linear light source which converged toward the second focus and rotated around the optical axis, when reflected by the reflector.

[0030] Furthermore, the still brighter illumination light will be obtained by having two or more above-mentioned lighting fixtures, and centralizing the illumination light from two or more lighting fixtures according to lighting fitting on which made it make the illumination light from each lighting fixture superimpose mutually.
[0031]
[Embodiment of the Invention] Hereafter, the suitable operation gestalt of this invention is explained to a detail, referring to drawing 1 thru/or drawing 19. In addition, since the operation gestalt described below is the suitable example of this invention, desirable various limitation is attached technically, but especially the range of this invention is not restricted to these modes, as long as there is no publication of the purport which limits this invention in the following explanation.
[0032] Drawing 1 shows the configuration of 1 operation gestalt which applied this invention to the lighting fixture for cars. the reflective member 20 which the lighting fixture 10 for cars is a lighting fixture which realizes from the horizontal line of the headlight of the automobile for the so-called low beams, downward luminous intensity distribution, i.e., horizontal diffusion luminous intensity distribution, in drawing 1 , and was arranged in the backside [LED array 11 as a linear light source, and LED array 11] -- since -- it is constituted.
[0033] Above-mentioned LED array 11 is constituted by putting two or more LED array modules 12 as shown in drawing 2 in order along with a longitudinal direction. The plurality mounted together with the longitudinal direction here within crevice 13a of a substrate 13 as the LED array module 12 was shown in drawing 2 , 5 [for example,], and ten LED chips 14 (in the case of illustration five pieces), the LED chip 14 -- a wrap -- the fluorescent substance layer 15 arranged like and the front face of a substrate 13 -- almost -- the whole -- a wrap -- the silicon gel 16 formed like and the surface whole of a substrate 13 -- a wrap -- the lens 17 formed like -- since -- it is constituted.
[0034] The above-mentioned LED chip 14 for example, by being constituted as blue LED of the chip size of die-length D (= 1.0mm) of one side, and making one of them contact wall surface 13b of crevice 13a By each LED chip's 14 shifting to the side, and arranging only the core of the longitudinal direction of a substrate 13 to distance D / 2, it is arranged in line by 1 side-edge 14a of the longitudinal direction along the core of the longitudinal direction of a substrate 13.
[0035] The above-mentioned fluorescent substance layer 15 consists of for example, YAG fluorescent substances, is excited by the exposure light from the LED chip 14, and carries out outgoing radiation of the white light. While the above-mentioned silicon gel 16 protects the LED chip 14 and a fluorescent substance 15, generating of the clearance between lenses 17 is prevented and it is made for the drawing effectiveness of light not to fall.
[0036] The above-mentioned lens 17 has the semicircle tubed appearance prolonged in a longitudinal direction, and it is formed so that the medial axis may be mostly in agreement with 1 side-edge 14a of each above-mentioned LED chip 14. If die length of one side of R and the LED chip 14 is set to D and a critical angle is set to alpha, the semicircle tubed radius of a lens 17 here If the internal reflection of a lens 17 is reduced, for example, it ****s to R= 2.1mm D= 1.0mm and alpha= 42.5 degrees by determining a radius R according to the following formula R>=root2.D-/sinalpha Effective light can be taken out from the LED chip 14 at about 80% of drawing effectiveness on count about the light which carries out outgoing radiation.
[0037] It has the first concave reflector 21 and the second reflector 22 established in the both sides of the first reflector 21 toward the front so that the above-mentioned reflective member 20 may reflect the light from LED array 11 and may be made to reflect it toward the front.
[0038] When the horizontal axis x directions and ahead of a lighting fixture is made into the rectangular coordinate system which makes the perpendicular vertical direction the direction of y for the longitudinal direction of LED array 11 to the direction of z, and a longitudinal direction, the first reflector 21 of the above is formed as an ellipse reflector in the cross section (it is a perpendicular cross section to the longitudinal direction of LED array 11) of yz flat surface.
[0039] Here, as the ellipse reflector was shown in the schematic diagram of drawing 3 (B), the reflector which consists of the cross-section curve which can be expressed in the elliptic curve which constitutes

the ellipse which has a primary focus (F1) and a secondary focus (F2) in the direction of z, i.e., the curve of the locus of the point P which is fixed on 1 flat surface, is said. However, in this specification, as an ellipse reflector, although it is not in agreement not only with the ellipse reflector in a narrow sense mentioned above but the elliptic curve which has a primary focus and a secondary focus strictly, the reflector which consists of the cross-section curve which can be approximated to this ellipse cross section is also included. Therefore, the primary focus and secondary focus of an elliptic curve which also approximate a primary focus and a secondary focus not only to the primary focus in the cross-section curve which can be realized by the elliptic curve and a secondary focus in a narrow sense but to each reflector are included.

[0040] Moreover, when an include angle parallel to the luminescence side of LED array 11 is made into 0 times, the first reflector 21 of the above is formed so that an include angle psi may enter within the limits of 0 times to 120 degrees. In addition, in drawing 1 , it is formed in the so-called Quonset so that it may have the same configuration also in which yz flat-surface cross section, but the first reflector 21 may be formed so that it may have curvature not only about this but about x directions.

[0041] And so that the first focal location 21a may be located near the core of the lens 17 of LED array 11 arranged upward, as the first reflector 21 is shown in drawing 3 (A) Moreover, it is arranged and he is trying to satisfy the regulation as a headlight so that second focal location 21b may be caudad located about 0.5 degrees from the optical axis O (z-axis) on the screen of first focal location 21a, for example, the front of 25m. Here, as shown in drawing 3 , above-mentioned LED array 11 is arranged so that the whole may be ahead located by 1 side-edge 14a of the LED chip 14 from first focal location 21a in accordance with first focal location 21a of the first reflector 21.

[0042] By this 1 side-edge 14a of each LED chip 14 of LED array 11 It is located near [focal location 21a / of the first reflector 21] the first along the core of a lens 17. Since each LED chip 14 whole is ahead arranged from this first focal location 21a, the light L1 which carried out outgoing radiation from one side edge 14a of each LED chip 14 Without receiving the refraction operation in yz flat-surface cross section of a lens 17, it will be reflected by the first reflector 21 and will progress toward second focal location 21b.

[0043] Moreover, since each whole LED chip 14 is arranged so that it may be ahead located rather than 1 side-edge 14a, after being refracted with a lens 17, it is reflected by the first reflector 21, and rather than light L1, the light from the LED chip 14 will go caudad, and will progress. For example, the light L2 which carried out outgoing radiation from other side edges which become a front side most is always reflected downward rather than second focal location 21b. Therefore, toward the front, rather than second focal location 21b below a horizontal line, the light which carried out outgoing radiation from the LED chip 14 and the fluorescent substance layer 15, and was reflected in the first reflector 21 goes caudad, and is irradiated. Since the light L1 which carried out outgoing radiation from one side edge 14a of the LED chip 14 do not receive the refraction operation in a perpendicular cross section (yz flat surface) to the longitudinal direction (x directions) of a lens 17 at this time , the boundary of the exposure field and the non-irradiating field in the horizontal line of the light in which it be reflect in the first reflector 21 and which be irradiate toward the front below at a horizontal line be irradiate , and , thereby , contrast become good .

[0044] On the other hand, the second reflector 22 of the reflective member 20 is formed as a parabolic reflector at xz flat surface (cross section perpendicular to a longitudinal direction and the direction of an optical axis), as shown in drawing 4 . Here, with a parabolic reflector, this specification is defined as a parabolic reflector including the false parabolic curve reflector which consists of the Bezier curve which does not have the shaft of a parabolic curve strictly, although the reflector which can be approximated not only to the parabolic reflector which serves as a cross-section curve which can be expressed in a parabolic curve in the vertical section of a reflector but to this paraboloid, for example, a parabolic curve, is especially resembled as long as there is no notice. The above-mentioned parabolic reflector on both sides (only the 1 side is shown by drawing 4) of the first reflector 21 The light of the maximum diffusion angle theta (for example, 45 degrees) which carried out outgoing radiation from edge 11a of the opposite side of LED array 11, and was reflected by the first reflector 21 is reflected. So that it may

irradiate toward the target point for obtaining a predetermined luminous-intensity-distribution pattern on a front screen For example, the point under about 0.5 degrees (refer to drawing 5) is made into a focal location on the screen of the target point A, for example, the front of 25m, just under a medial axis O (z-axis). It consists of parabolas C which make the starting point further edge 21a by the side of one of the first reflector 21 centering on the shaft B with which only the include angle theta inclined from the target point A to the medial axis O, the sweep of the parabola C concerned was carried out in the direction of y, i.e., it is considering as the reflector where Parabola C appears in xz flat-surface cross section.

[0045] And terminal point 22a of the above-mentioned parabolic reflector is taken as the paraboloid-of-revolution reflector which rotated Parabola C centering on Shaft B as a location as for which the light of the maximum diffusion angle theta which carried out outgoing radiation from the edge of the opposite side of LED array 11, and was reflected by the first reflector 21 carries out incidence. Thereby, it is reflected by the second reflector 22, and is reflected downward [almost level] toward the target point A, and the light diffused the include angle more than the maximum diffusion angle theta from LED array 11 raises the illuminance near a core.

[0046] The lighting fixture 10 for cars by this invention operation gestalt is constituted as mentioned above, and the light which carried out outgoing radiation from LED array 11 is irradiated toward the front by being reflected in the first reflector 21 and second reflector 22 of the reflective member 20 by electric power's being supplied by the drive circuit which each LED chip 14 of LED array 11 does not illustrate, and emitting light.

[0047] being controlled about a perpendicular direction based on the configuration of the first reflector 21, in case it is reflected by the first reflector 21 of a reflective member, as the light which carried out outgoing radiation from LED array 11 is shown in drawing 5 here -- a horizontal line H -- small -- downward exposure field D' -- it goes and irradiates. Moreover, the light irradiated toward the part of the light reflected by the first reflector 21 and the both ends of exposure field D' Are reflected by the second reflector 22, and based on the configuration of the second reflector 22, it is related horizontally and controlled. The light equivalent to the both-ends field of exposure field D' by the first reflector 21 irradiates the field of the lower part of a medial axis O, makes the illuminance of a core brighter, and forms the exposure field D restricted to the maximum diffusion angle theta as a whole. The luminous-intensity-distribution pattern which fitted the horizontal diffusion luminous intensity distribution in the so-called low beam as shown in drawing 6 by this will be obtained.

[0048] In addition, although, as for LED array 11, the reflective member 20 is arranged in the lighting fixture 10 for cars mentioned above at the optical-axis O bottom by arranging the LED chip 14 on an optical axis O at the top face of a substrate 13, i.e., facing up As shown not only in this but in drawing 7 , LED array 11 is arranged downward on an optical axis O, and the reflective member 20 may be made to be arranged at the optical-axis O bottom. In this case, LED array 11 is arranged so that the whole may be located more back than first focal location 21a by 1 side-edge 14a of that LED chip 14 in accordance with first focal location 21a of the first reflector 21. By this, like the case of the arrangement shown in drawing 3 , when reflected by the first reflector 21 of the reflective member 20, the light which carried out outgoing radiation from LED array 11 will go caudad, and will be irradiated more slightly than an optical axis O.

[0049] In addition, the light which generally carries out outgoing radiation from an LED chip has directional characteristics. When the line light source arranged so that it may align in the location from which other side edges separated from the core of a lens 17 is used so that 1 side-edge 14a of each LED chip 14 of LED array 11 may be mostly in agreement with the medial axis of a lens 17 and as mentioned above, the side to which the directional characteristics of LED array 11 shifted the LED chip 14 as shown in drawing 8 R> 8 shows the directional characteristics which inclined in the opposite direction (it is a left at drawing 8). In addition, in drawing 8 , the direction of a normal is made into 0 times, a left is made into the minus direction and the method of the right is made into the plus direction. And the first reflector 21 mentioned later is arranged to the direction of radiation, i.e., a drawing left, so that the light of the medial axis of these inclined directional characteristics may be reflected. Here, in order to miniaturize the whole lighting fixture, it is desirable [it is high in the use effectiveness of light and] to

determine the magnitude of the lens 17 for which it asked according to the LED chip size and the formula 1 mentioned above so that it may become the LED light source of magnitude which is located in the range whose medial axes of the directional characteristics of an LED array are 20 thru/or 50 degrees.

[0050] Furthermore, if the first reflector 21 is made into at least 0 thru/or the range of 100 degrees as shown in drawing 9 , it can raise the use effectiveness over the light irradiated from LED array 11 equipped with the directional characteristics shown in drawing 8 mentioned above. If it is desirable to arrange practical so that 60% or more of light can be effectively reflected among the light from the above-mentioned linear light source and it makes the first reflector 21 0 thru/or the range of 120 degrees, it will become possible to reflect effectively about 80% or more of light in the direction of a cross section of the first reflector 21.

[0051] Furthermore, in the lighting fixture 10 for cars mentioned above, as shown in drawing 3 or drawing 7 , LED array 11 is arranged so that the front face of the substrate 13 may extend in accordance with an optical axis O, but as are shown not only in this but in drawing 10 or drawing 11 , and shown in the tilt angle phi, for example, drawing 10 , or drawing 12 toward back to an optical axis O, it inclines and it may be arranged only 10 degrees. It becomes possible to increase the light L which carried out outgoing radiation from LED array 11 reflected in these cases in the first reflector 21, will be reflected more efficiently in the first reflector 21 and second reflector 22 of the reflective member 20, and will irradiate toward the front, and the illuminance of a luminous-intensity-distribution pattern will improve. Therefore, in order to obtain the same illuminance, the reflective member 20 may be constituted small.

[0052] Drawing 13 shows the configuration of the second operation gestalt of the lighting fixture for cars by this invention. In drawing 13 , the lighting fixture 30 for cars is the headlight of the automobile for the so-called low beams, since it is the almost same configuration as the lighting fixture 10 for cars shown in drawing 1 thru/or drawing 4 , gives the same sign to the same component part, and omits the explanation.

[0053] The above-mentioned lighting fixture 30 for cars has different composition in that the reflective member 20 is further equipped with the third reflector 31 in addition to the first reflector 21 and second reflector 22. The third reflector 31 of the above is arranged to the field between the first reflector 21 and the second reflector 22, as shown in drawing 13 .

[0054] The third reflector 31 of the above is constituted as a compound reflector which consists of two or more reflectors, and each reflector 31a consists of ellipsoids of revolution. Each reflector 31a by reflecting the light from LED array 11 So that a lower part may be irradiated on the left-hand side from the target point A from the line E of 15 Hidari risers (refer to drawing 14 (A)) The light which it is formed and carried out outgoing radiation along this cut-off line E from one side edge 14a of each LED chip 14 of a linear light source 11 It goes on without receiving a refraction operation of a lens 17, and contrast of the boundary of the exposure field of a luminous-intensity-distribution pattern and a non-irradiating field can be made clear along the cut-off line E.

[0055] Here, the third reflector 31 of the above is explained, referring to drawing 15 and drawing 16 . As shown in drawing 15 , it asks for the elliptic curve which makes the point on a linear light source 11 a primary focus F1, and uses the target point A of the direction of -y as a secondary focus F2 only about 0.5 degrees [z-axis] on the screen ahead of 25m. An elliptic curve is rotated by setting a revolving shaft as the straight line which connects F1 and F2, and an ellipsoid of revolution is created. Thus, in the reflector which consists of the obtained ellipsoid of revolution, focusing on the point F2 that the primary focus F1 was projected on the screen, the projection image by the linear light source 11 rotates, and is acquired. A part of rotation ellipse reflector which irradiates the field of the range to the line E of 15 Hidari risers using the property which this light source image rotates is set to reflector 31a. Thus, the configuration of the acquired rotation ellipse reflector is shown in drawing 16 . In drawing 16 , a front field is rotation ellipse reflector 31a. In addition, in drawing 15 , although the example at the time of setting the location of the central point of a linear light source 11 to F1 is shown in order to make explanation easy to understand, in each reflector 31a, it is the location of the arbitration on a linear light source 11 instead of the central point on a linear light source 11, and each reflector 31a is formed, using

as F1 the location corresponding to the light source reflected in each reflector, respectively. Thereby, as shown in drawing 14 (A), the luminous-intensity-distribution pattern caudad irradiated from the line E of 15 Hidari risers on the left-hand side can be obtained from the target point A.

[0056] According to the lighting fixture 30 for cars of such a configuration, like the lighting fixture 10 for cars mentioned above, it is reflected by the first reflector 21 and second reflector 22 of the reflective member 20, and by irradiating toward the front, the light which carried out outgoing radiation from LED array 11 will form the horizontal diffusion luminous-intensity-distribution pattern which spread in the lower part more slightly than the same horizontal line H, if shown in drawing 6 . Furthermore, when the light from LED array 11 is reflected by the third reflector 31 of the reflective member 20 and the left-hand side slanting upper part irradiates a little toward the front, as shown in drawing 14 R> 4 (A), a lower part is irradiated a little than a horizontal line H from the line E of 15 Hidari risers with the up side in the target point A to left-hand side.

[0057] Therefore, as shown in drawing 14 (B), the luminous-intensity-distribution pattern with which it was superimposed on the luminous-intensity-distribution pattern of drawing 14 (A) formed more nearly caudad than 15 left risers is formed a little on the screen ahead of a lighting fixture from a horizontal line H at the bottom on an optical axis O to the luminous-intensity-distribution pattern of drawing 6 formed caudad more slightly than a horizontal line H, and left-hand side. Thereby, when the lighting fixture 30 for cars is carried, in the core of an exposure field, it is superimposed on the exposure light by the reflectors of a reflector 21, a reflector 22, and a reflector 31, and a high illuminance can be obtained. Thus, since the curbstone of the road shoulder, a pedestrian, a road sign, etc. are brightly illuminated on the left-hand side of [front] an automobile, the safety of the car of left-hand traffic can be secured further. Moreover, since the cut-off line F of the direction of a horizontal line which is the boundary of an exposure field and a non-irradiating field, and the cut-off line E of upper left slant become clear, dazzling light etc. can be reduced.

[0058] In addition, what is necessary is just to consider as 15 upward slants to the right with this operation gestalt, in the case of right-hand traffic, although he is trying to illuminate a lower part from the line E of 15 front left risers. Moreover, although the slanting exposure field is formed according to the reflector which consists of an elliptic curve, the rotation reflector which used not only an elliptic curve but other conic sections may be adopted. However, in the case of a rotation ellipse reflector, the luminous-intensity-distribution pattern of condensing nature can be obtained easily, but it is desirable in the case of other conic sections, to use an elliptic curve as the conic section, since it is easy to become the luminous-intensity-distribution pattern of diffusibility.

[0059] Drawing 17 shows the configuration of the third operation gestalt of the lighting fixture for cars by this invention. In drawing 17 , the lighting fixture 40 for cars is the headlight of the automobile for the so-called low beams, since it is the almost same configuration as the lighting fixture 30 for cars explained with the second operation gestalt, gives the same sign to the same component part, and omits the explanation.

[0060] The front-like light source section 41 by which, as for the above-mentioned lighting fixture 40 for cars, the linear light source 43 has been arranged ahead of the first reflector 21, It has composition which is different only at the point constituted. the second linear light source section 42 arranged ahead of the third reflector 31 -- since -- a linear light source 43 As mentioned above, it is arranged in line by one side edge of the longitudinal direction along the core of the longitudinal direction of a substrate by an LED chip's shifting to the side and arranging only the core of the longitudinal direction of a substrate to distance D / 2.

[0061] As shown in drawing 17 , the second linear light source section 42 is arranged corresponding to each reflector 31a of the third reflector 31 which consists of a compound reflector, and is not formed in the field between each reflector 31a. The second linear light source section 42 is reflected by each reflector 31, without the light which carried out outgoing radiation receiving a refraction operation of a direction perpendicular to the longitudinal direction of a lens 17 from one side edge of an LED chip. each reflector 31a and every -- As the reflected light irradiates the cut-off line E of 15 front left risers shown in drawing 14 (A), the light which carried out outgoing radiation from the second linear light

source section 42 irradiates the lower part of the cut-off line E. Each second linear light source section 42 arranged corresponding to each reflector 31a of the third reflector 31 restricts the exposure width of face in the direction of slant only to a predetermined field 15 degrees, and he is trying for the light which irradiates the upper part or a lower part extremely not to produce it by controlling that die length suitably at this time.

[0062] It is made to be the same as that of the lighting fixture 30 for cars mentioned above according to the lighting fixture 40 for cars of such a configuration. While being able to form the luminous-intensity-distribution pattern suitable for the headlight of the automobile for the so-called low beams as shown in drawing 14 (B) and raising the formation effectiveness of the luminous-intensity-distribution pattern by the linear light source 41 By not forming in the field corresponding to between each reflector of the third reflector 31 of the second linear light source section 42, installation and power consumption of the light source of the part can be reduced, and cost can be reduced. In addition, although it is also possible to form the front-like light source section 41 and each second linear light source section 42 in an exception object, respectively, as for a linear light source 43, in LED array 11 mentioned above, it is desirable to unify mutually and to constitute, as the LED chip 16 corresponding to a nonluminescent field is not arranged.

[0063] Drawing 18 shows the configuration of the fourth operation gestalt of the lighting fixture for cars by this invention. In drawing 18 , the lighting fixture 50 for cars is the headlight of the automobile for the so-called low beams, on the lighting fixture 10 for cars shown by drawing 1 , since it is the configuration of having piled up the lighting fixture 30 for cars shown in drawing 13 R> 3, gives the same sign to the same component part, and omits the explanation.

[0064] The luminous-intensity-distribution pattern shown in drawing 6 which spreads to a downward field more slightly [according to the lighting fixture 50 for cars of such a configuration] than the horizontal line H by the lighting fixture 10 for cars mentioned above, It is made for the luminous-intensity-distribution pattern shown in drawing 14 (B) which has the cut-off line E Hidari slanting above [by the lighting fixture 30 for cars] and the direction cut-off line F of a horizontal line to lap from the cut-off line F in a downward location. By installing each lighting fixture unit, the luminous-intensity-distribution pattern of a higher illuminance can be obtained.

[0065] In addition, in order to obtain a desired luminous-intensity-distribution pattern and brightness, still more nearly another lighting fixture unit may be used, or the exposure field of the compound reflector in each lighting fixture unit may be combined with a proper rate, or the exposure field by each lighting fixture **** is restricted to the proper range, and you may make it obtain predetermined luminous intensity distribution with the combination of two or more lighting fixture units. When using two or more lighting fixture units, it may install not only in what is installed up and down but in right and left side by side, or you may make it combine the lighting fixture unit from which magnitude differs.

[0066] In the operation gestalt mentioned above, although the LED module 12 which constitutes LED array 11 is equipped with the semicircle tubed lens 17, it may be equipped with the wrap semi-sphere-like lens not only for this but for each LED chip 14. however, when it is going to obtain the luminous-intensity-distribution pattern which spreads in a direction almost parallel to a light source longitudinal direction If it carries out to a lens with which the same cross-section configuration appears in a perpendicular cross section to a longitudinal direction, for example, the lens configuration which a semicircle ball makes carry out the parallel displacement of the curve approximated to this toward a longitudinal direction, and appears Since the light which carried out outgoing radiation from the LED chip shows the same diffusion in a longitudinal direction, it becomes easy to obtain uniform luminous intensity distribution in a direction almost parallel to a light source longitudinal direction, and is desirable. In addition, when the false ellipse reflector and false parabolic reflector which are approximated to each reflector are used as an ellipse reflector and a parabolic reflector in the operation gestalt mentioned above, the luminous-intensity-distribution pattern mentioned above becomes a different thing strictly, but since the luminous-intensity-distribution pattern by the ellipse reflector or parabolic reflector to approximate and the approximated luminous-intensity-distribution pattern are

obtained, a problem can use such an approximation side practically within limits not becoming.
[0067] Moreover, the reflector which consists of the cross-section curve which can be expressed in the elliptic curve which constitutes the ellipse which has a primary focus and a secondary focus in the direction of z so that it may be easy to understand in explanation of the operation gestalt mentioned above, And although explained based on the ellipse reflector including the reflector which consists of the cross-section curve which can be approximated to this ellipse cross section although it is not in agreement with the elliptic curve which has a primary focus and a secondary focus strictly That for which the cross-section configuration used the secondary rational Bezier curve (= conic section) is said to a wide sense. The reflector which can be expressed by the definition of the ellipse reflector containing the curve which approximated the conic section by free form curve like NURBS (Hiroshi Toritani work; foundation and application; of three dimensional CAD KYORITSU SHUPPAN Co., Ltd. issue) can also be used. For example, if the contrast of the boundary of the exposure field and the non-irradiating field by the lighting fixture is emphasized Although it is desirable to consider as an ellipse reflector in a narrow sense, the reflector shown exaggeratingly yz cross-section configuration which combined two or more conic sections as shown in drawing 19 (A), It can have yz cross-section configuration which used the free form curve which has point of inflection as shown in drawing 19 (B), and can also carry out to the reflector which carried out the sweep of the cross-section curve which starts in the x directions as it was, i.e., the reflector where all the cross sections in yz flat surface serve as the same cross-section curve. All the loci of the beam of light which can be set horizontally become the same from it being the reflector which carried out the sweep in the x directions, if these reflectors are used, it sets horizontally and an almost uniform luminous-intensity-distribution pattern is obtained, about the vertical direction, the reflective pattern which prepared roughness and fineness in distribution of a reflected ray locus based on the illustrated reflector is obtained, and the operation gestalt which used such a reflector is also included by the invention in this application.
[0068] Furthermore, in the operation gestalt mentioned above, although the pedestal as an LED array which installed two or more LED chips was used, field light emitting devices, such as EL (electroluminescence devices) extended and formed in the longitudinal direction, may be used as the light source. Moreover, although the linear light sources 11 and 30 for lighting fixtures used for the lighting fixture 10 for cars as a headlight for the low beams of an automobile were explained Not only this but this invention A headlight, or the auxiliary LGTs for automobiles (the fog lamp, the driving lamp, back-up lamp, etc.) and the signalling lamp for automobiles (the tail lamp, the turn lamp, stop lamp, etc.) for main beams of an automobile, Or it is clear that this invention can be applied to the linear light source for lighting fixtures for using it for various lighting fixtures, such as traffic lights other than for automobiles (for example, a traffic sign LGT), a general lighting LGT, a pendent light, a common annunciator, and a common signalling lamp.

[Translation done.]

* NOTICES *

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2.**** shows the word which can not be translated.
3.In the drawings, any words are not translated.

DESCRIPTION OF DRAWINGS

[Brief Description of the Drawings]
[Drawing 1] It is the outline perspective view showing the first operation gestalt of the lighting fixture for cars by this invention.
[Drawing 2] It is the (A) perspective view, the (B) top view, and the (C) side elevation showing the configuration of the LED array in the lighting fixture for cars of drawing 1 .
[Drawing 3] It is the outline side elevation showing the lighting fixture for cars of drawing 1 .
[Drawing 4] It is the outline top view showing the lighting fixture for cars of drawing 1 .
[Drawing 5] It is the outline perspective view showing actuation of the lighting fixture for cars of drawing 1 .
[Drawing 6] It is the schematic diagram showing the luminous-intensity-distribution pattern by the lighting fixture for cars of drawing 1 .
[Drawing 7] It is the outline side elevation showing the first modification of the lighting fixture for cars of drawing 1 .
[Drawing 8] It is the graph which shows the directional characteristics of the LED array in the lighting fixture for cars of drawing 1 .
[Drawing 9] It is the expanded sectional view showing the relation of the LED array and the first reflector in the lighting fixture for cars of drawing 1 .
[Drawing 10] It is the outline side elevation showing the second modification of the lighting fixture for cars of drawing 1 .
[Drawing 11] It is the outline side elevation showing the third modification of the lighting fixture for cars of drawing 1 .
[Drawing 12] It is the expanded sectional view showing the relation of the LED array and the first reflector in the lighting fixture for cars of drawing 10 .
[Drawing 13] It is the outline perspective view showing the second operation gestalt of the lighting fixture for cars by this invention.
[Drawing 14] It is the schematic diagram showing the luminous-intensity-distribution pattern by the (A) third reflector of the reflective member of the lighting fixture for cars of drawing 13 , and the luminous-intensity-distribution pattern by the whole (B) reflective member.
[Drawing 15] It is the outline perspective view showing the configuration and arrangement of the third of a reflector in the lighting fixture for cars of drawing 13 .
[Drawing 16] It is the expansion perspective view showing the reflector of drawing 15 .
[Drawing 17] It is the outline perspective view showing the third operation gestalt of the lighting fixture for cars by this invention.
[Drawing 18] It is the outline perspective view showing the fourth operation gestalt of the lighting fixture for cars by this invention.
[Description of Notations]
10 Lighting Fixture for Cars
11 LED Array (Linear Light Source)

12 LED Module
13 Substrate
14 LED Chip
15 Fluorescent Substance
16 Silicon Gel
17 Lens
20 Reflective Member
21 First Reflector
22 Second Reflector
30 Lighting Fixture for Cars
31 Third Reflector
40 50 Lighting fixture for cars
41 Front-like Light Source Section
42 Second Linear Light Source Section
43 Linear Light Source

[Translation done.]

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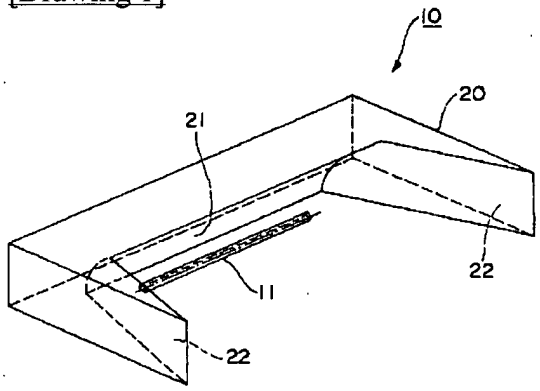
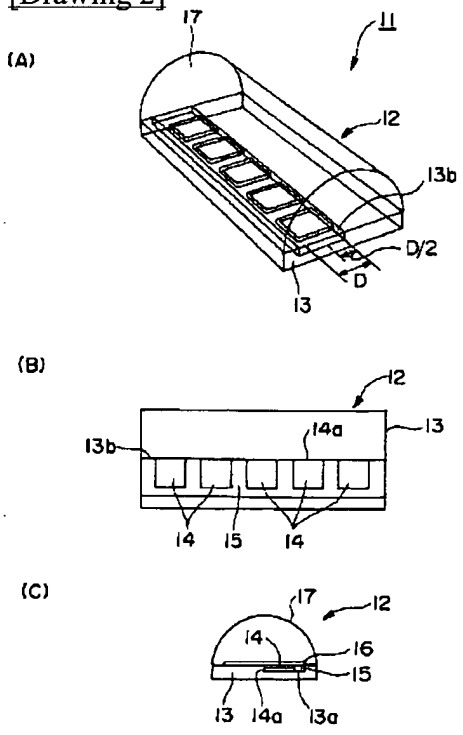
DRAWINGS

[Drawing 1]



[Drawing 2]



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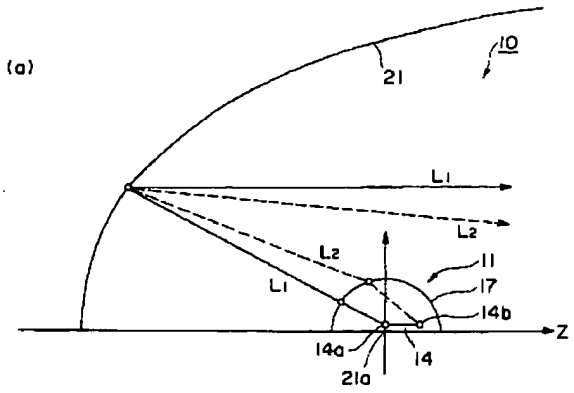

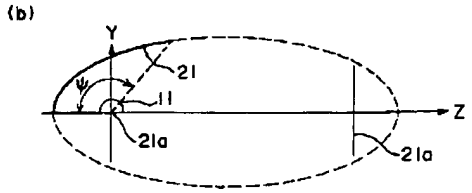

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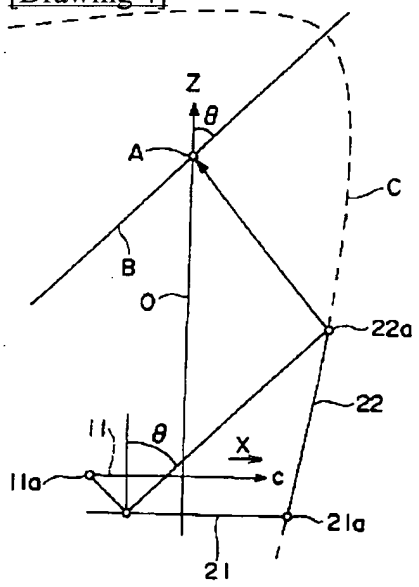

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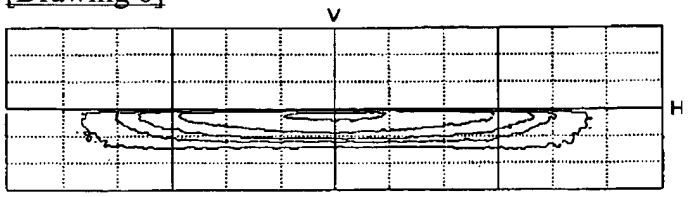

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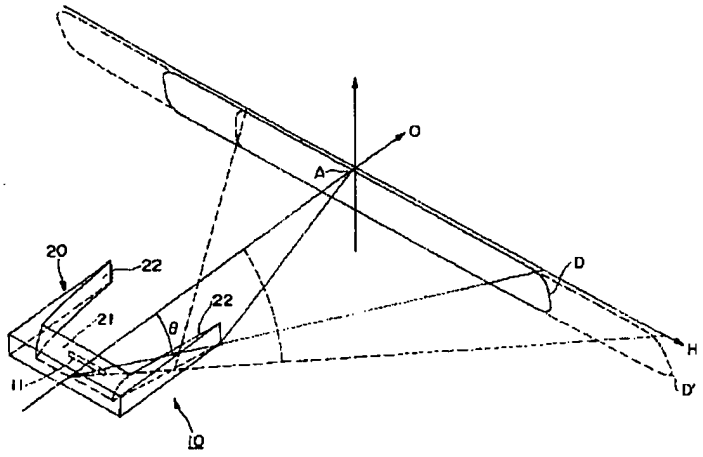

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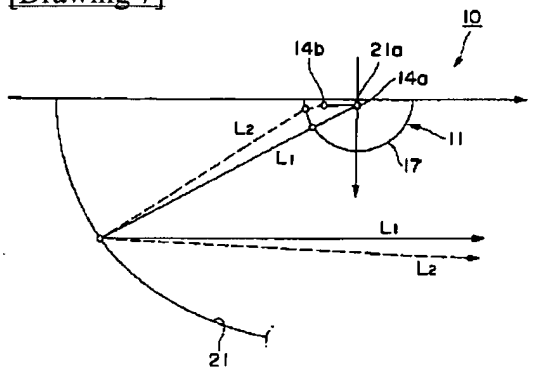

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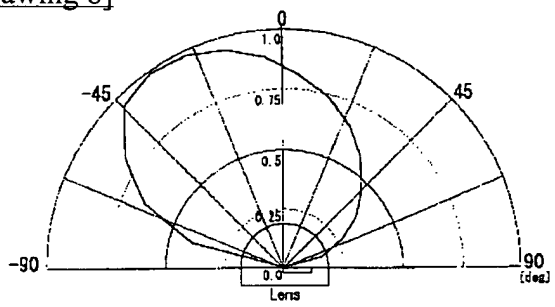

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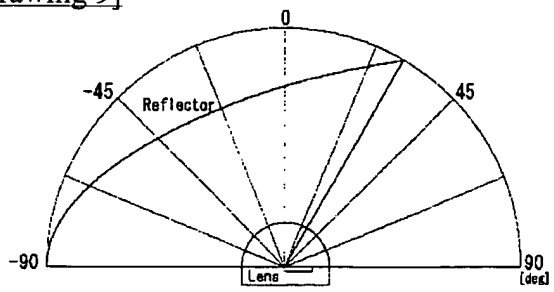
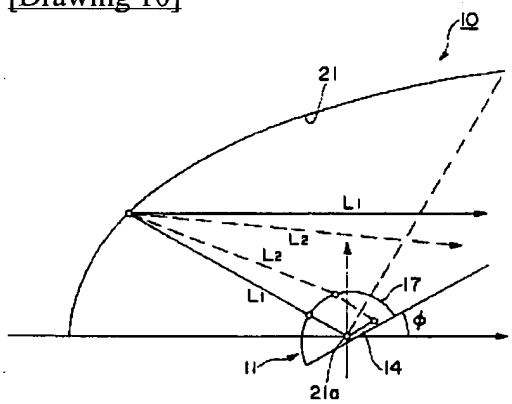


[Drawing 10]



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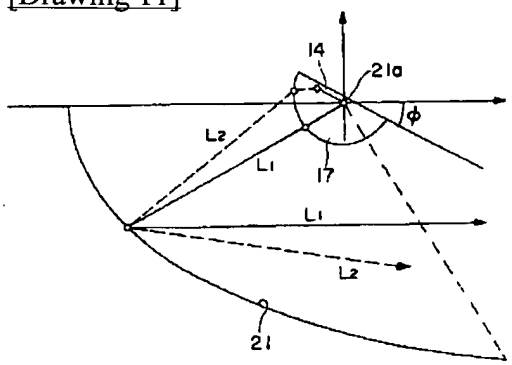

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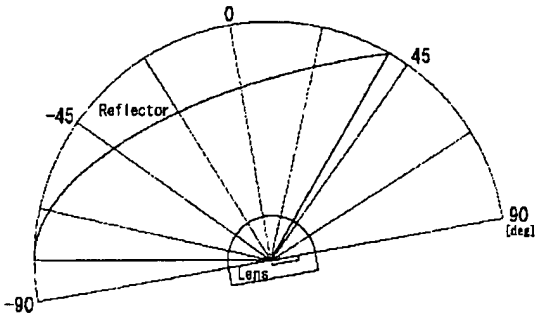
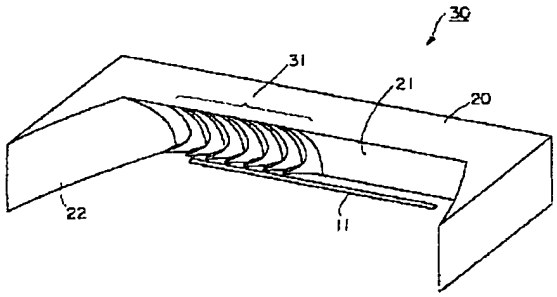


[Drawing 13]



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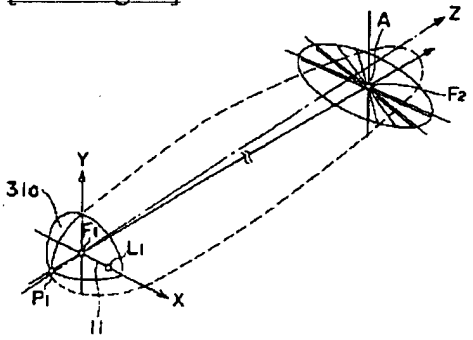

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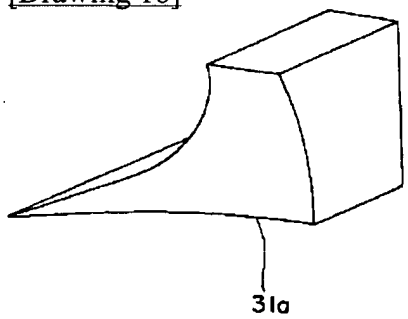

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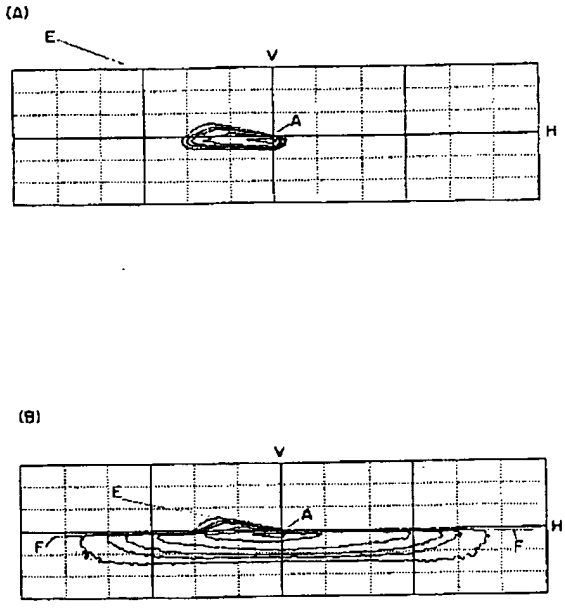

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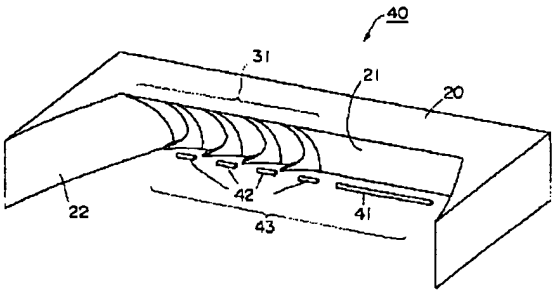
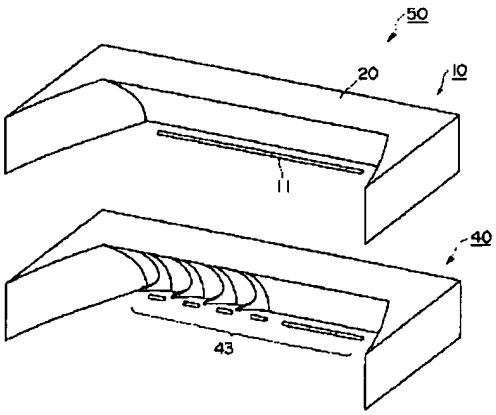


[Drawing 18]



[Translation done.]